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Trinix

DIGITAL VIDEO ROUTER

Planning and Installation Manual

SOFTWARE VERSION 2.4.1

071827607
August 4, 2007

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United States

15655 SW Greystone Ct.
Beaverton, OR 97006
United States

10 Presidential Way
3rd Floor, Suite 300
Woburn, MA 01801
United States

Nederland B.V.
4800 RP BREDA
The Netherlands

Weiterstadt, Germany
Brunnenweg 9
D-64331 Weiterstadt
Germany

Rennes, France
Rue du Clos Courtel
Cesson-Sevigne, Cedex
France

Technopole Brest Iroise
CS 73808
29238 Brest Cedex 3
France

17 rue du Petit Albi-BP 8244
95801 Cergy Pontoise
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2300 South Decker Lake Blvd.
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Ph: (215)997-4519
Fax: (215)997-3809

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Contacting Grass Valley

<table>
<tr><td>International Support Centers</td><td>France 24 x 7</td><td>+800 8080 2020 or +33 1 48 25 20 20
+800 8080 2020 or +33 1 48 25 20 20</td><td>United States/Canada 24 x 7</td><td>+1 800 547 8949 or +1 530 478 4148</td></tr>
<tr><td rowspan="4">Local Support Centers (available during normal business hours)</td><td>Asia</td><td colspan="3">Hong Kong, Taiwan, Korea, Macau: +852 2531 3058 Indian Subcontinent: +91 22 24933476
Southeast Asia/Malaysia: +603 7805 3884 Southeast Asia/Singapore: +65 6379 1313
China: +861 0660 159 450 Japan: +81 3 5484 6868</td></tr>
<tr><td colspan="3">Australia and New Zealand: +61 1300 721 495</td><td>Central/South America: +55 11 5509 3443</td></tr>
<tr><td colspan="4">Middle East: +971 4 299 64 40 Near East and Africa: +800 8080 2020 or +33 1 48 25 20 20</td></tr>
<tr><td>Europe</td><td colspan="3">Belarus, Russia, Tadzikistan, Ukraine, Uzbekistan: +7 095 2580924 225 Switzerland: +41 1 487 80 02
S. Europe/Italy-Roma: +39 06 87 20 35 28 -Milan: +39 02 48 41 46 58 S. Europe/Spain: +34 91 512 03 50
Benelux/Belgium: +32 (0) 2 334 90 30 Benelux/Netherlands: +31 (0) 35 62 38 42 1 N. Europe: +45 45 96 88 70
Germany, Austria, Eastern Europe: +49 6150 104 444 UK, Ireland, Israel: +44 118 923 0499</td></tr>
</table>

Grass Valley Web Site

The www.thomsongrassvalley.com web site offers the following:

Online User Documentation — Current versions of product catalogs, brochures, data sheets, ordering guides, planning guides, manuals, and release notes in .pdf format can be downloaded.

FAQ Database — Solutions to problems and troubleshooting efforts can be found by searching our Frequently Asked Questions (FAQ) database.

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END-OF-LIFE PRODUCT RECYCLING NOTICE

Grass Valley's innovation and excellence in product design also extends to the programs we've established to manage the recycling of our products. Grass Valley has developed a comprehensive end-of-life product take back program for recycle or disposal of end-of-life products. Our program meets the requirements of the European Union's WEEE Directive, the United States Environmental Protection Agency, and U.S. state and local agencies.

Grass Valley's end-of-life product take back program assures proper disposal by use of Best Available Technology. This program accepts any Grass Valley branded equipment. Upon request, a Certificate of Recycling or a Certificate of Destruction, depending on the ultimate disposition of the product, can be sent to the requester.

Grass Valley will be responsible for all costs associated with recycling and disposal, including freight. However, you are responsible for the removal of the equipment from your facility and packing the equipment to make it ready for pickup.

For further information on the Grass Valley product take back system please contact Grass Valley at + 800 80 80 20 20 or +33 1 48 25 20 20 from most other countries. In the U.S. and Canada please call 800-547-8949 or 530-478-4148, and ask to be connected to the EH&S Department. Additional information concerning the program can be found at: www.thomsongrassvalley.com/environment

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Contents

Preface

About This Manual

This manual provides system planning, installation and troubleshooting information specific to the Trinix Digital Video Router.

The Trinix Digital Video Router can be controlled by the Grass Valley Jupiter or Encore Control System. Configuration information for the control system itself is contained in the control system's documentation set:

Jupiter Control System Release Notes series, 0718275xx.
Jupiter VM-3000 Installation and Operating Manual, 0718305xx.
Jupiter CM-4000 Installation and Operating Manual, 0718261xx.
Jupiter Getting Started Guide, 04-045707-003.

Encore Control System Release Notes series, 0718153xx.
Encore Installation and Service Manual, 0718103xx.
Encore Control System User Manual, 0718104xx.
Encore Control Panels Manual, 0718053xx

An electronic copy of the documentation set is normally provided with the system on CD-ROM 0718130xx. The CD Includes SMS7000 Series Control System, Acappella, Concerto, Encore, Jupiter, JEP 100, Prelude, and Trinix documentation.

Individual printed manuals may be ordered by contacting Technical Support. They are also available on our web site. See page 4.

Additional Documentation

NetCentral IV TV Facility Monitoring System User Guide, 0718338xx.

CD-ROM 071827407 includes legacy Jupiter, Saturn, Triton, and Venus manuals.

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Safety Summary

Read and follow the important safety information below, noting especially those instructions related to risk of fire, electric shock or injury to persons. Additional specific warnings not listed here may be found throughout the manual.

WARNING **Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.**

Safety Terms and Symbols

Terms in This Manual

Safety-related statements may appear in this manual in the following form:

WARNING **Warning statements identify conditions or practices that may result in personal injury or loss of life.**

CAUTION Caution statements identify conditions or practices that may result in damage to equipment or other property, or which may cause equipment crucial to your business environment to become temporarily non-operational.

Terms on the Product

The following terms may appear on the product:

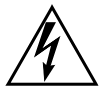
DANGER — A personal injury hazard is immediately accessible as you read the marking.

WARNING — A personal injury hazard exists but is not immediately accessible as you read the marking.

CAUTION — A hazard to property, product, and other equipment is present.

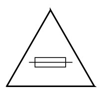
Symbols on the Product

The following symbols may appear on the product:

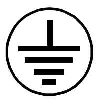


Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

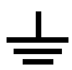
Indicates that user, operator or service technician should refer to product manual(s) for important operating, maintenance, or service instructions.



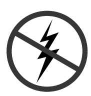
This is a prompt to note fuse rating when replacing fuse(s). The fuse referenced in the text must be replaced with one having the ratings indicated.



Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.



Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.



Indicates that static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Warnings

The following warning statements identify conditions or practices that can result in personal injury or loss of life.

Dangerous voltage or current may be present — Disconnect power and remove battery (if applicable) before removing protective panels, soldering, or replacing components.

Do not service alone — Do not internally service this product unless another person capable of rendering first aid and resuscitation is present.

Remove jewelry — Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.

Avoid exposed circuitry — Do not touch exposed connections, components or circuitry when power is present.

Use proper power cord — Use only the power cord supplied or specified for this product.

Ground product — Connect the grounding conductor of the power cord to earth ground.

Operate only with covers and enclosure panels in place — Do not operate this product when covers or enclosure panels are removed.

Use correct fuse — Use only the fuse type and rating specified for this product.

Use only in dry environment — Do not operate in wet or damp conditions.

Use only in non-explosive environment — Do not operate this product in an explosive atmosphere.

High leakage current may be present — Earth connection of product is essential before connecting power.

Dual power supplies may be present — Be certain to plug each power supply cord into a separate branch circuit employing a separate service ground. Disconnect both power supply cords prior to servicing.

Double pole neutral fusing — Disconnect mains power prior to servicing.

Use proper lift points — Do not use door latches to lift or move equipment.

Avoid mechanical hazards — Allow all rotating devices to come to a stop before servicing.

Cautions

The following caution statements identify conditions or practices that can result in damage to equipment or other property

Use correct power source — Do not operate this product from a power source that applies more than the voltage specified for the product.

Use correct voltage setting — If this product lacks auto-ranging power supplies, before applying power ensure that the each power supply is set to match the power source.

Provide proper ventilation — To prevent product overheating, provide equipment ventilation in accordance with installation instructions.

Use anti-static procedures — Static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Do not operate with suspected equipment failure — If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.

Ensure mains disconnect — If mains switch is not provided, the power cord(s) of this equipment provide the means of disconnection. The socket outlet must be installed near the equipment and must be easily accessible. Verify that all mains power is disconnected before installing or removing power supplies and/or options.

Route cable properly — Route power cords and other cables so that they ar not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.

Use correct power supply cords — Power cords for this equipment, if provided, meet all North American electrical codes. Operation of this equipment at voltages exceeding 130 VAC requires power supply cords which comply with NEMA configurations. International power cords, if provided, have the approval of the country of use.

Use correct replacement battery — This product may contain batteries. To reduce the risk of explosion, check polarity and replace only with the same or equivalent type recommended by manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Troubleshoot only to board level — Circuit boards in this product are densely populated with surface mount technology (SMT) components and application specific integrated circuits (ASICS). As a result, circuit board repair at the component level is very difficult in the field, if not impossible. For warranty compliance, do not troubleshoot systems beyond the board level.

Regulatory Notices

Certifications and Compliances

FCC Emission Control

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by Grass Valley Group can affect emission compliance and could void the user's authority to operate this equipment.

Canadian EMC Notice of Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'emet pas de bruits radioélectriques dépassant les limites applicables aux appareils numeriques de la classe A préscrites dans le Règlement sur le brouillage radioélectrique édicte par le ministère des Communications du Canada.

EN 55103 Class A Warning

For products that comply with Class A. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Canadian Certified Power Cords

Canadian approval includes the products and power cords appropriate for use in the North America power network. All other power cords supplied are approved for the country of use.

Canadian Certified AC Adapter

Canadian approval includes the AC adapters appropriate for use in the North America power network. All other AC adapters supplied are approved for the country of use.

Laser Compliance

Laser Safety Requirements

The device used in this product is a Class 1 certified laser product. Operating this product outside specifications or altering from its original design may result in hazardous radiation exposure, and may be considered an act of modifying or new manufacturing of a laser product under U.S. regulations contained in 21CFR Chapter1, subchapter J or CENELEC regulations in HD 482 S1. People performing such an act are required by law to recertify and reidentify this product in accordance with provisions of 21CFR subchapter J for distribution within the U.S.A., and in accordance with CENELEC HD 482 S1 for distribution within countries using the IEC 825 standard.

Laser Safety

Laser safety in the United States is regulated by the Center for Devices and Radiological Health (CDRH). The laser safety regulations are published in the “Laser Product Performance Standard,” Code of Federal Regulation (CFR), Title 21, Subchapter J.

The international Electrotechnical Commission (IEC) Standard 825, “Radiation of Laser Products, Equipment Classification, Requirements and User’s Guide,” governs laser products outside the United States. Europe and member nations of the European Free trade Association fall under the jurisdiction of the Comite European de Normalization Electrotechnique (CENELEC).

For the CDRH: The radiant power is detected trough a 7 mm aperture at a distance of 200 mm from the source focused through a lens with a focal length of 100 mm.

For IEC compliance: The radiant power is detected trough a 7 mm aperture at a distance of 100 mm from the source focused through a lens with a focal length of 100 mm.

FCC Emission Limits

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may no cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation. This device has been tested and found to comply with FCC Part 15 Class B limits for a digital device when tested with a representative laser-based fiber optical system that complies with ANSI X3T11 Fiber Channel Standard.

Certification

Category	Standard	Designed/tested for compliance with:
Safety	ANSI/UL 1950-1997 3rd Ed. CAN/CSA-C22.2 No. 950-95 EN 60950	Professional Video and Audio Equipment

Section 1

Introduction

General

The Trinix family of routing switchers represents a revolutionary new approach to digital[1] signal distribution that builds on the success of Venus—the best selling routing switcher ever. Trinix is a high-quality and fully featured digital video routing switcher offering a large number of crosspoints in one of the smallest physical frames available. Four fixed frame sizes are available: a 128 x 128 router in eight rack units, a 128 x 256 router in 12 RUs, a 256 x 256 router in 15 RUs, and a 512 x 512 router in 32 RUs. Fixed frame designs offer optimal solutions for customers who have minimum space requirements yet still need a large number of crosspoints. Features of the Trinix routing switcher architecture include:

- Fourth generation based on Venus
- Standard Definition (SD) and High Definition (HD) in the same frame
- Easy to upgrade
- High density in minimal space
- Each I/O card supports 32 signals
- Same "crosspoint bus" control as Venus, providing easy integration with Jupiter Facility Control Systems.
- Mission critical components are front loading and hot swappable
- Extensive alarm notification/status
- Load sharing power supplies
- Redundant fans
- Protected path operation
- Broadlinx option combines network interface, sync input, and output monitor circuitry; allows LAN-based control by Encore/SMS and system monitoring via Microsoft Internet Explorer. SNMP/NetCentral system monitoring also available
- Passive expanders for input/output expansion, dual/quad outputs
- Chassis design maximizes air flow

[1] The new VI-33100 module provides analog as well as digital inputs.

SD and HD in the Same Frame

Trinix supports both SD and HD video in all configurations. The matrix cards and high-speed backplane are designed for both SD and HD signals. The only difference between SD and HD implementations is the I/O cards. This makes upgrading easy on both budgets and implementation, thus solving the problem of deciding when to prepare for HD in a facility.

Easy to Create Very Large Routers

Creating very large routers in the Trinix design is accomplished by using special circuitry for simple and cost effective expansion. Using passive port expansion modules, a 1024 x 1024 router can be built in four equipment racks using four 512 x 512 frames coupled together with expanders. These expanders can also be used to provide dual or quad non-inverting outputs.

Control Systems

The Jupiter Facility Control System can be used to control the Trinix router using a crosspoint bus connection (see Glossary) to a VM-3000 System Controller or CM-4000 System Controller. The VM/CM can receive switching commands from a variety of serial sources, including Jupiter control panels or an automation computer.

The Trinix can also be controlled using direct Ethernet (“CPL”) integration with a Grass Valley Encore or SMS 7000 control system.

The Trinix Frame

- High-density crosspoints in compact frames
- Fixed matrix sizes can be combined to form larger routers
- Modular design allows for both HD and SD within the same frame

Trinix is optimized for crosspoint density, with reliability and serviceability in mind. Each frame has redundant power supplies, redundant fans, and a physical topology designed to maximize cooling. Mission critical modules are front loading and hot swappable.

All Trinix frames accommodate two load-sharing power supplies and have two AC inputs. This allows for full redundant operations. They are front loading and hot swappable and each power supply has its own fan for cooling. The 128 x 128 frame runs on a 600 W power supply, the 256 x 256 frame runs on a 1250 W power supply, and the 512 x 512 runs on two 1250 W power supplies—all with plenty of power to spare.

The 128 x 128 chassis includes two fan modules; the 256 x 256 chassis includes three, and the 512 x 512 includes six. Both power supplies and fan modules are front loading and hot swappable.

Trinix Architecture

The architecture of the Trinix signal flow is organized into three cards: input card, matrix card, and output card. These are connected to a passive backplane circuit card. Each input and output card accommodates 32 signals, which allows the routers to be built in increments of 32 as well a mixed population of SD and HD cards in increments of 32.

On switchers with HO-33110 HD and HO-33120 SD/HD output cards, signal reclocking can be set to "Auto On/Off" or "Off" for each of the 32 outputs. In "Auto On/Off" mode, properly-formed standard data rate signals will be reclocked but other signals will be bypassed (not reclocked). "Standard" data rates are listed on page 79.

The new VI-33100 "universal" input board auto-senses and accepts 16 composite analog SD, digital SD, or digital HD signals in any combination and passes them in digital SD or digital HD form (as appropriate) to the Trinix matrix board. When analog signals are received, an extensive set of gain, phase, filtering, and other adjustments are available for each signal. For a list of these adjustments, see page 40.

The BL-33000 Broadlinx option combines network interface, sync input, and output monitor circuitry. Each card has two sync inputs and two monitor outputs. Two cards can be installed for a total of four ports for each. The sync reference supports generation of Vertical Interval Switch Timing strobe from standard NTSC or PAL Black Burst or HDTV Tri-level sync defined in the SMPTE 274M-1998 standard (see Glossary). Sync reference granularity is 32 outputs. An internal DIP switch is used to select one of the available references for the respective 32-output blocks. Trinix can also operate without a sync reference.

The Trinix fixed-frame routers all come standard as pre-wired single-output units. The dual output option is implemented by adding physical expanders in increments of 16 up to 256. Both outputs are non-inverting and fully meet DVB-ASI (see Glossary) specifications.

Serviceability and Reliability

Trinix routing switchers are engineered by the same team that developed the Venus and Venus2001 family of routing switchers and use many of the same proven circuit designs that made the Venus line the best selling routers in the world. In addition, Trinix employs cutting-edge technology to reduce the number of components, increase the reliability of individual parts, enhance air movement throughout the chassis, and identify potential system problems in time to take preventive measures.

Trinix also offers Broadlinx technology, which aids serviceability by providing status displays and monitoring functions through a network connection.

All circuit boards contain some common circuitry for hot swapping, circuitry for DC to DC conversion, and a micro-controller as part of the Broadlinx technology.

Hot swap circuitry is used to simplify field servicing and upgrades.

The DC to DC conversion is necessary because the chassis design distributes one voltage, 48 volts, to all cards leaving the responsibility to each card to convert down to the needed voltage level.

Each board has a micro-controller that is part of an overall communications bus which is part of the hardware for the Broadlinx technology. This hardware is what gathers all of the particular board information (voltages, signal presence, reclocking settings, etc.) as well as enables the firmware updates via network connection.

For "protected path" operation, the Broadlinx software can be configured to monitor router outputs that are feeding critical downstream equipment (such as a transmitter). If the "primary" output signal is interrupted, the system will automatically select the "secondary" output that is carrying the same signal and trigger a system alarm. Protected path operation is available for single-chassis (non-expanded) systems only, with the exception of multi-chassis DV-33512 routers with expanded inputs. Protected path operation also requires HO-33120 HD/SD Output Boards in the paths to be protected. For more information, see page 60.

Broadlinx

The Broadlinx option, which consists of Broadlinx software running on the NR-33000 Sync/NIC/OPM board, allows SMS 7000 or Encore control using Grass Valley CPL (Control Point Language) through an Ethernet connection.

Broadlinx also provides web pages for the following operations:

- Network configuration of the NR-33000 board(s)
- Downloading of software upgrades to the various boards in the system
- System monitoring using Internet Explorer

When licensed to do so, Broadlinx will also support SNMP / NetCentral monitoring.

The monitoring network consists of a Windows PC, network interface connection (NIC) circuitry on the NR-33000 board, and microprocessors on each circuit board in the system. All of the processors are interconnected via a communications bus (Com Bus).

Broadlinx Web Page Monitoring

Broadlinx uses HTTP (Hypertext Transfer Protocol) web pages to deliver detailed system information through the network to a PC with Microsoft Internet Explorer 5.0 or newer (Internet Explorer 6 or newer is recommended for best performance).

Typical aspects that can be monitored as "warnings" or alarms are all the voltages on each circuit board, input signal presence, and output reclocking status. Also, information on the current version of firmware that is being used is available.

For more information, see *Broadlinx / Internet Explorer Monitoring* on page 166.

SNMP/NetCentral Monitoring

When enabled, the Trinix SNMP (Simple Network Management Protocol) Agent allows the Grass Valley NetCentral application to monitor the following:

Table 1.

Item	Description
System	Broadlinx board IP Address and frame type.
Fans	Fan names and status
Board	Master Status of input, output, and crosspoint boards
Signal	Master Status of input and output signals present on frame
Reference	Status of reference signal(s) presented to the Broadlinx board
Power	AC and DC status of each power supply
Thermal	Master Frame temperature status

The Trinix SNMP agent is supplied with Broadlinx 2.2 and later software. By default, the agent is disabled; a hardware address (MAC) based license key must be obtained for it to become active. This license can be purchased as part of the original system or later by contacting Grass Valley Technical Support. The MAC address is shown in the "SNMP" section of the "Configuration" Broadlinx web access display; an "Enter License Key" button allows entry of the Grass Valley-supplied key. For an illustration, see page 164.

Because the license is stored in the NR-33000 board flash memory, a new key will have to be obtained if the board is ever replaced. However, in the case of redundant NR-33000 installations, if the secondary board (i.e., the board not having the licensed MAC address) is replaced the existing license will automatically be copied to the new board when installed.

NetCentral

NetCentral is a suite of software modules residing on one or more computers. These modules work together to monitor and report the operational status of SNMP-enabled devices such as Trinix, Encore, 7500NB/WB frames, Concerto Fast Controllers, etc.

When the Trinix SNMP Agent is activated, it automatically sends messages to the NetCentral Monitoring Station, reporting the device status. (Up to five Monitoring Stations are supported.) Messages are given a Status Level ranging from "Informational" to "Critical." The NetCentral Monitoring Station can be configured to listen to and, depending on Status Level, respond to these messages in a variety of ways, including:

- Sound computer "beep"
- Play sound file
- Send E-mail message to one or more addresses
- Send E-mail message to pager or cell phone
- Run program
- Open web browser and go to specified URL

For example, when a Critical message is received, NetCentral can be configured to open an Internet Explorer window and go to the Home Page for the Broadlinx web pages described under *Broadlinx / Internet Explorer Monitoring* on page 166.

The Trinix SNMP Agent provides support for NetCentral, but does not include the actual NetCentral product, which is available separately. Once the Trinix SNMP Agent is installed and configured, it can be monitored by NetCentral, or by any other SNMP management application.

For more information, please refer to the NetCentral User Guide, part no. 071 8338 xx.

Non-NetCentral Managers

For information concerning registration of Monitoring Stations (SNMP Managers) for use with non-NetCentral SMNP management applications, please refer to *Appendix A-SNMP Managers*.

Section 2

Planning Guide

Introduction

The following discussion is intended to provide both an overview and an in-depth understanding of the configuration possibilities of the Trinix Digital Video Routing Switcher.

Included in this document are the details necessary for the planning and designing of your facility with the Trinix router in mind.

The beginning of this section includes conceptual descriptions and drawings for those who need a basic understanding of the product and the configuration options. Later subsections provide additional detail such as connection diagrams and ordering information.

Note If you are actually installing the router at this time, please refer to *Section 3-Installation* on page 91.

Trinix Frame

Trinix routers are available in four fixed frame sizes:

- DV-33128: 128 x 128 in 8 rack units (RU). See Figure 1 and Figure 2.
- DV-33256: 256 x 256 in 15 RUs. See page 30 and page 31.
- DV-33512: 512 x 512 in 32 RUs. See page 32 and page 33.

Figure 1. DV-33128 front view (door removed).

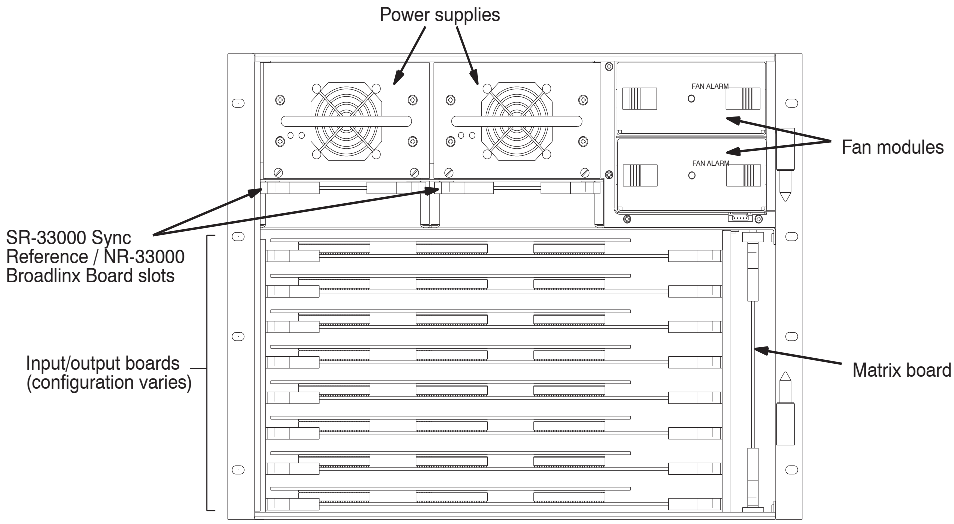


Figure 2. DV-33128 rear panel.

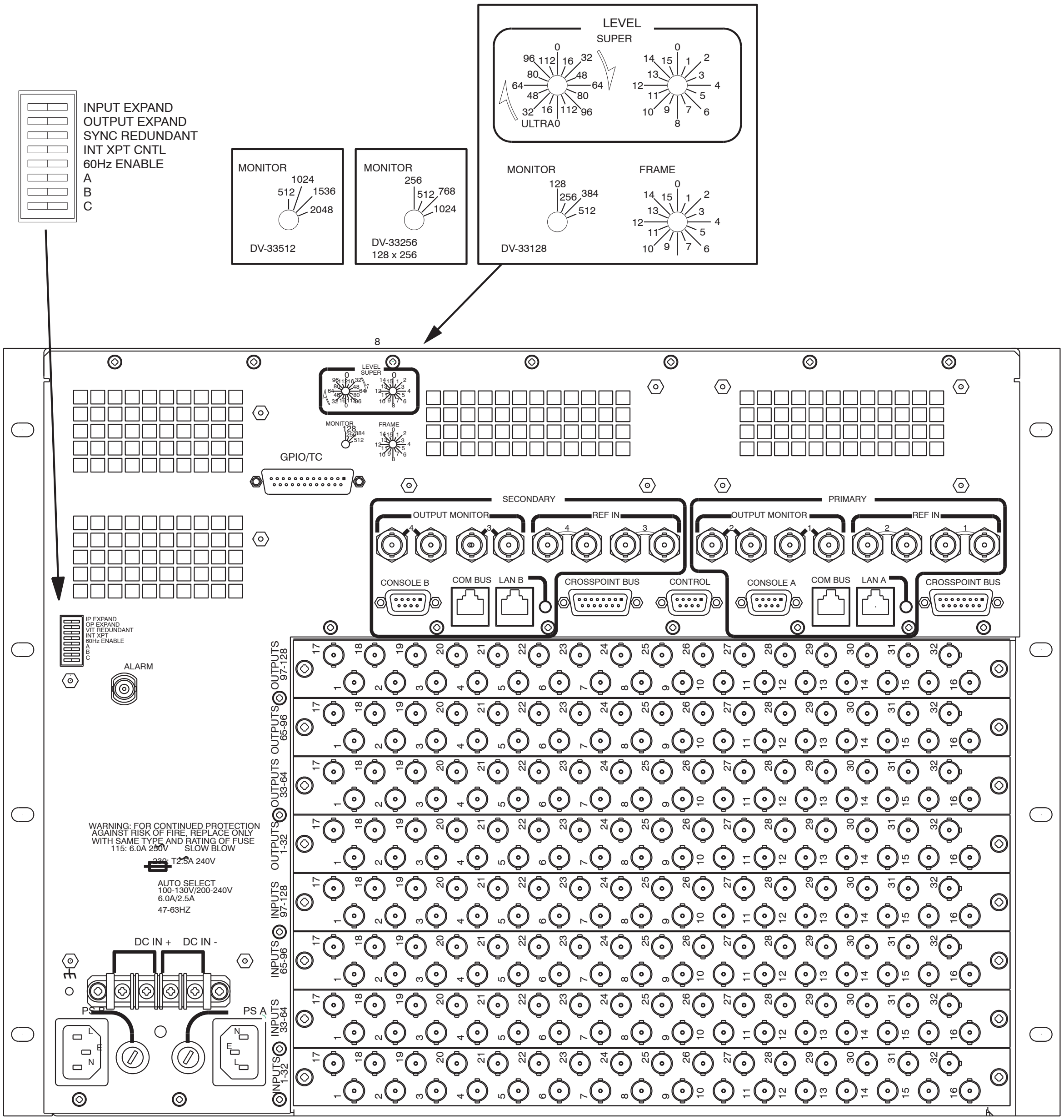


Figure 3. DV-33256 front view (door removed).

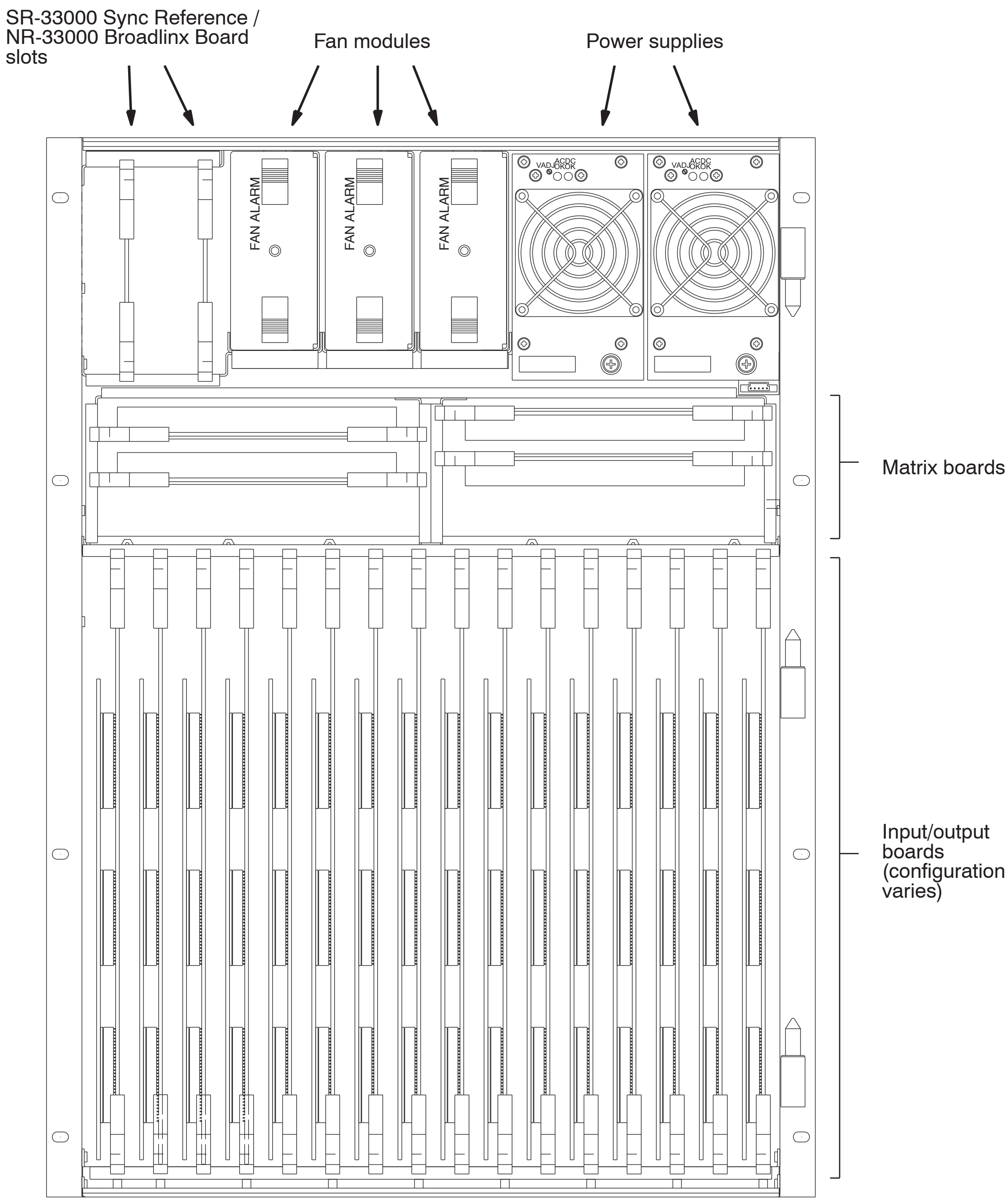


Figure 4. DV-33256 rear panel

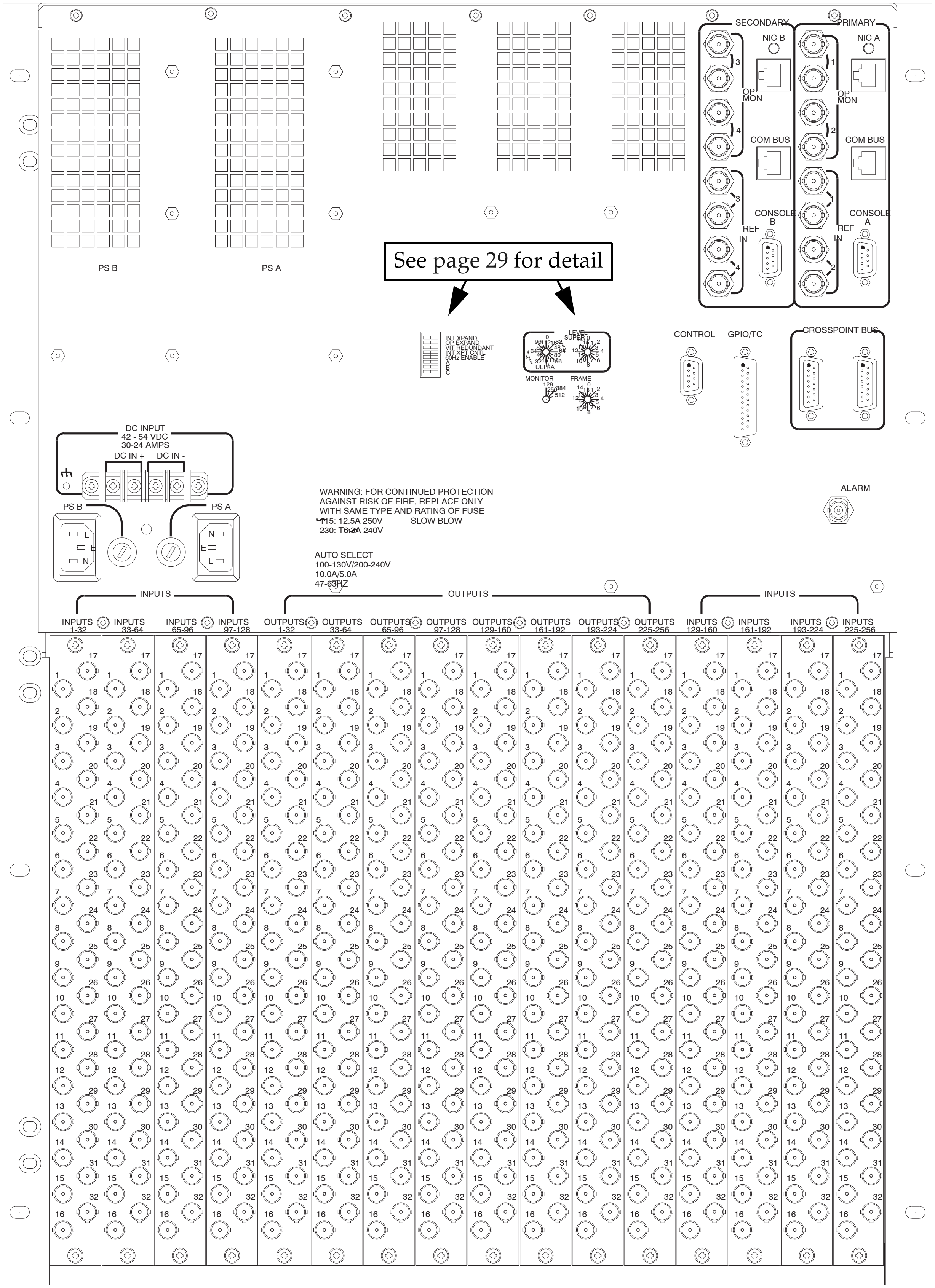


Figure 5. DV-33512 main chassis and associated power supply unit.

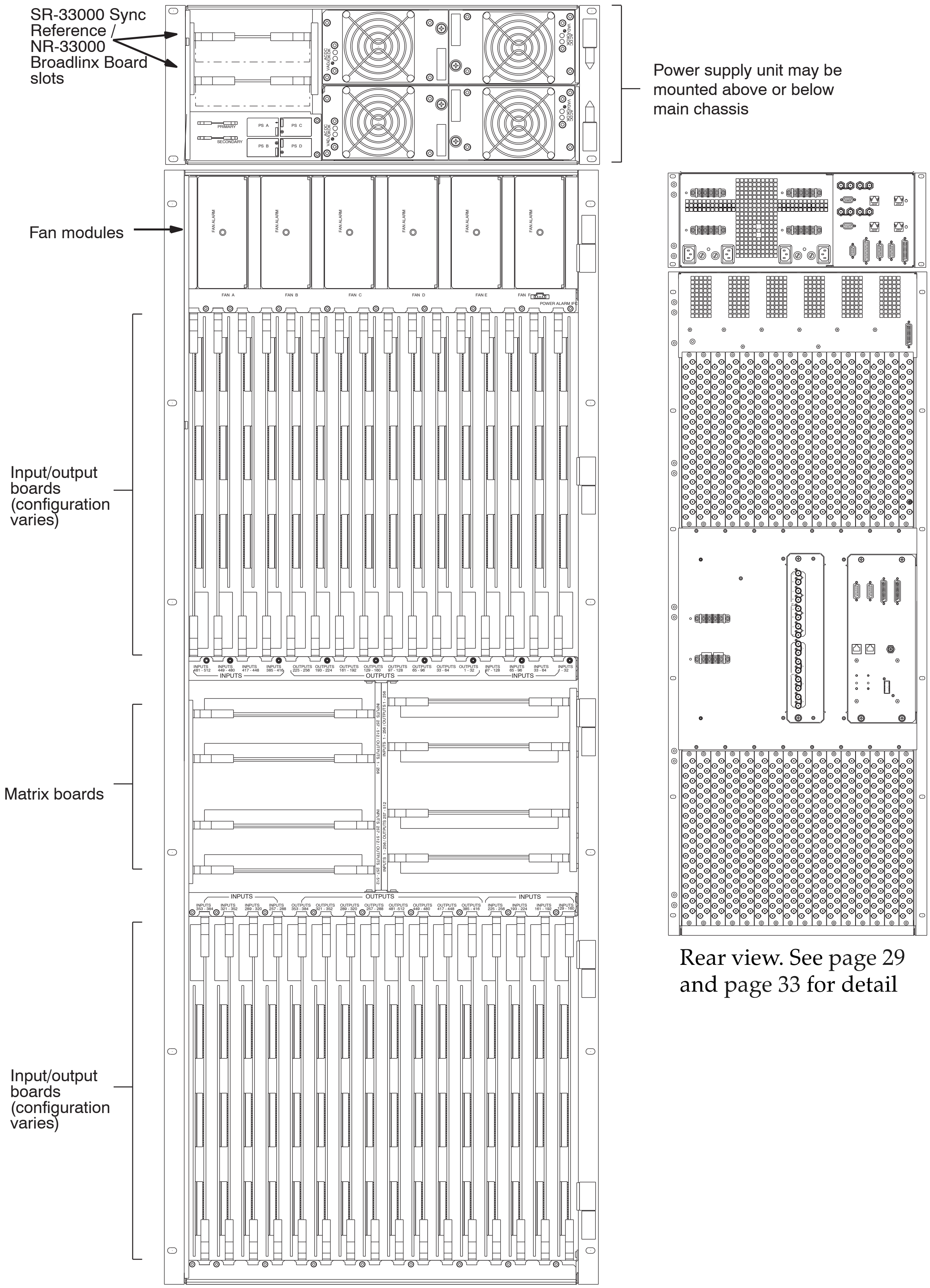


Figure 6. DV-33512 main chassis and power supply chassis.

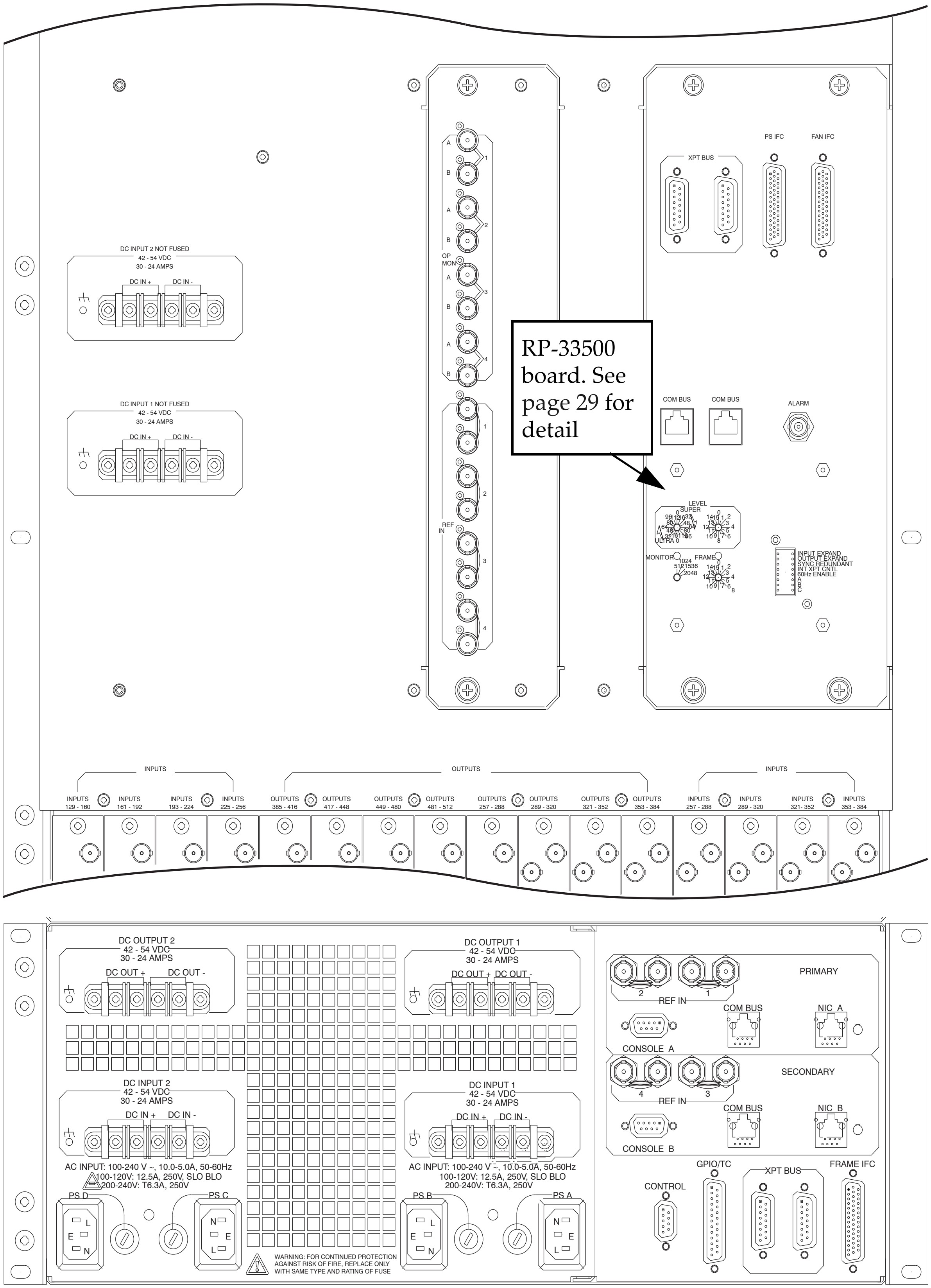
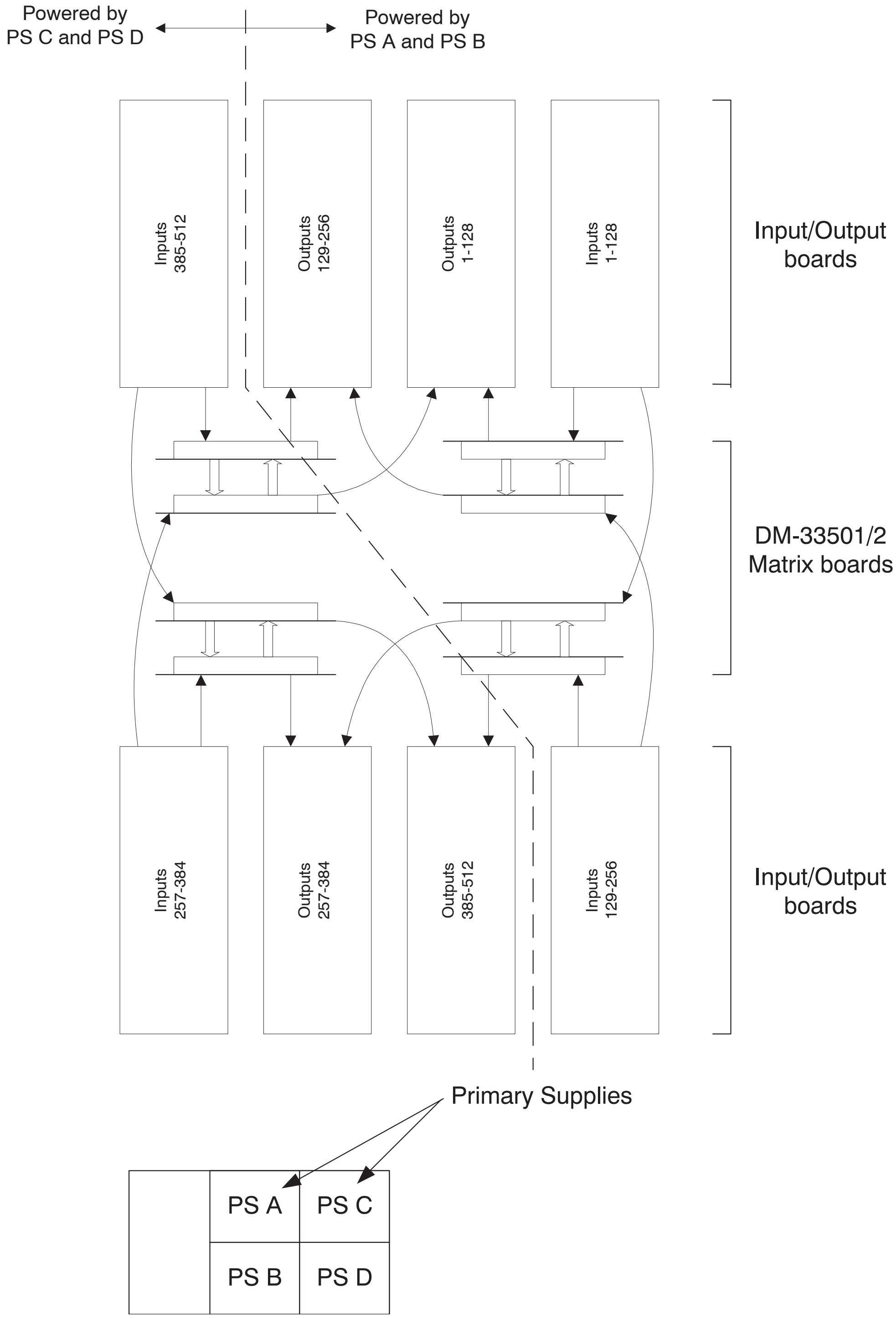


Figure 7. Signal flow and power supply system for DV-33512 router.



Power Supplies

Two power supply types are used in the Trinix routing family, one type for the 128 chassis and another for the 256 and 512 chassis. Both types, which share the same feature set, are OEM products. The power supplies differ primarily in power delivered, size, and weight.

The 128 and 256 chassis are designed for two power supplies. The optional (and recommended) second supply provides redundancy and increased reliability due to "load sharing" - both supplies work less, creating less strain and decreasing the likelihood of failure of either unit.

In AC power applications, the 512 chassis is equipped with two power supplies mounted in a separate chassis. For redundancy, space is provided for two additional supplies (recommended). The 512 power supply chassis may be mounted above or below the main chassis, depending on video cable routing requirements (or weight distribution requirements).

All power supplies are front loading and hot swappable and each has its own fan for cooling. Automatic line sensing technology is used to adapt the supply to all major power standards throughout the world. The back panel of the chassis provides a separate AC connector for each supply and a third connection for a 48 VDC input.

The power supplies each deliver 48 volts to all components and the individual components convert down the voltages for their particular need.

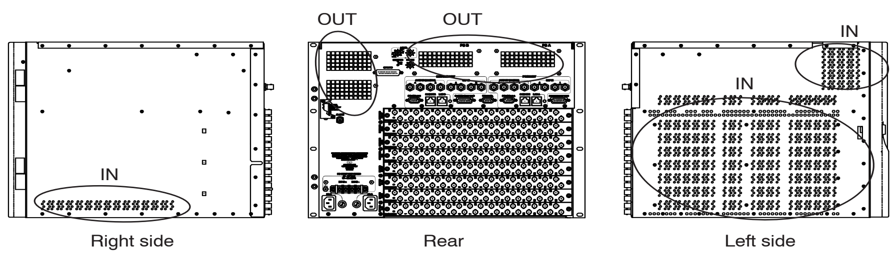
For additional redundancy, it is possible to operate the router with a combination of internal power supplies and a external DC power source.

Cooling System

The Trinix uses *fan modules* (FM-33000) for cooling the main chamber of the chassis. A fan module consists of two blower-type fans that are housed in a mechanical assembly. The 128 x 128 chassis uses two modules, the 256 x 256 chassis uses three, and the 512 uses six. The fan modules are front-loading and hot-swappable.

Airflow openings for the 128 chassis are shown in Figure 8. Air is taken in from the sides of the chassis (primarily the left side), where the air is drawn across the I/O cards, past the matrix card, and up to the top rear of the chassis where it is expelled. A small amount of air is drawn from the right side of the chassis as well to help cool the matrix board.

Figure 8. Airflow openings for DV-33128 chassis.



Airflow openings for the 256 and 512 chassis are shown in Figure 9 and Figure 10. Air is taken in from the bottom of the chassis (cut-outs are located on the very bottom of the sides), and from the central area of the left and right sides. This air is then drawn up through all of the I/O cards as well as the matrix boards to the top rear of the chassis and expelled out the back.

Figure 9. Airflow openings for DV-33256 chassis.

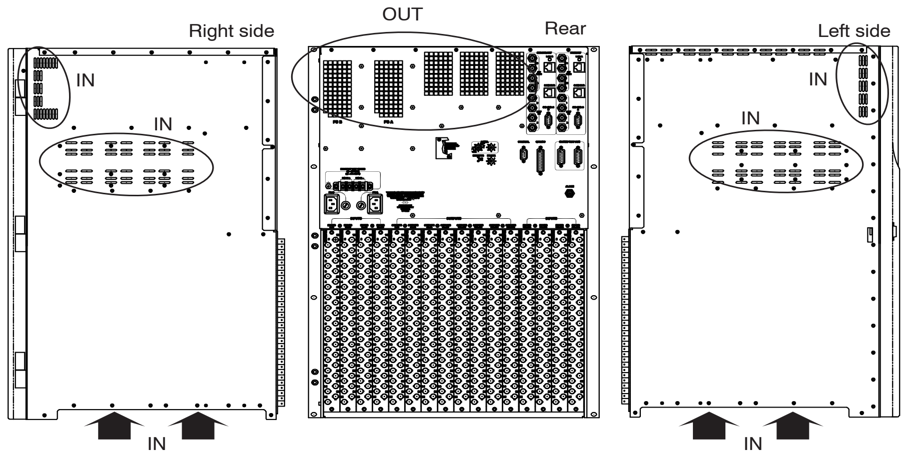
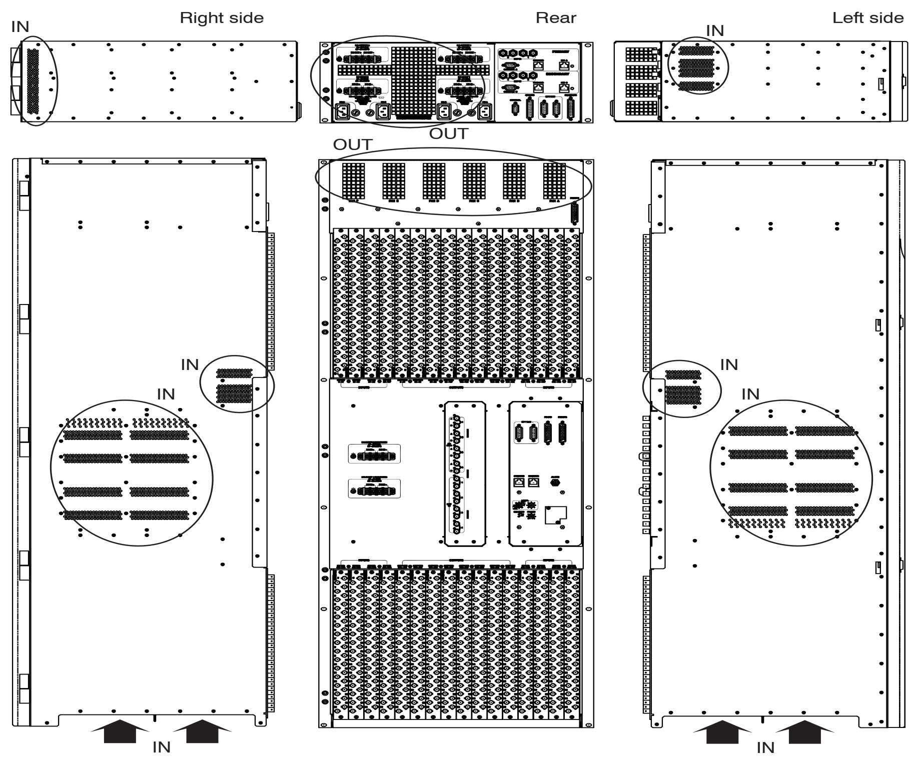


Figure 10. Airflow openings for DV-33512 power supply and main chassis.



Using a central set of fan modules to cool the main chamber eliminates the possibility of cooling loss in one area due to failure of a single fan. If a fan does fail, the system will continue to operate, providing a safe interval during which the failed fan can be replaced and the system returned to normal redundant operation.

Sync Reference Options

For synchronous vertical interval switching the same sync reference signal must be sent to the control system (e.g., Jupiter CM-4000) and to the Trinix. (The Trinix will operate without a sync connection but switching will be non-synchronous.) Each sync input uses looping 75 ohm BNC connectors.

The sync signal can be NTSC or PAL black burst, or tri-level (HD) sync, and up to four sync signals can be mixed within the same chassis on an output-board basis. For example, NTSC sync could be used for one set of 32 outputs and HD sync for another set of 32 outputs.

In **DV-33128** and **DV-33256** units, one or two independent sync signals can be connected to a NR-33000 Broadlinx board and either of these can then be selected for use on each output board. Adding a second Broadlinx board provides a total of four independent sync sources.

In **DV-33512** units, which are normally supplied with an SR-33500 Sync/OPM board, up to four independent sync sources can be connected and any of the four can be selected for each output board. If desired, an NR-33000 board can be installed in the associated power supply chassis to provide Broadlinx capability. It is also possible to divide the sync sources between the SR-33500 and the Broadlinx board but the maximum number of sync sources is always four.

Sync Redundant mode

For all systems, two Broadlinx boards can be operated in Sync Redundant mode where the sync signal(s) are looped through each board; if the primary Broadlinx board fails the system will switch automatically to the secondary board. However, for redundant operation the number of sync signals is limited to two.

For sync reference details, see page 107.

Output Monitoring

With the DV-33128 and DV-33256 chassis, two pairs of output monitor ports are provided by the NR-33000 board (one side of each pair is inverted). Two additional dual ports are optionally available when a second NR-33000 is added; this would provide a total of four monitor ports.

With the DV-33512 chassis, the SR-33500 Sync/OPM board provides four monitoring ports.

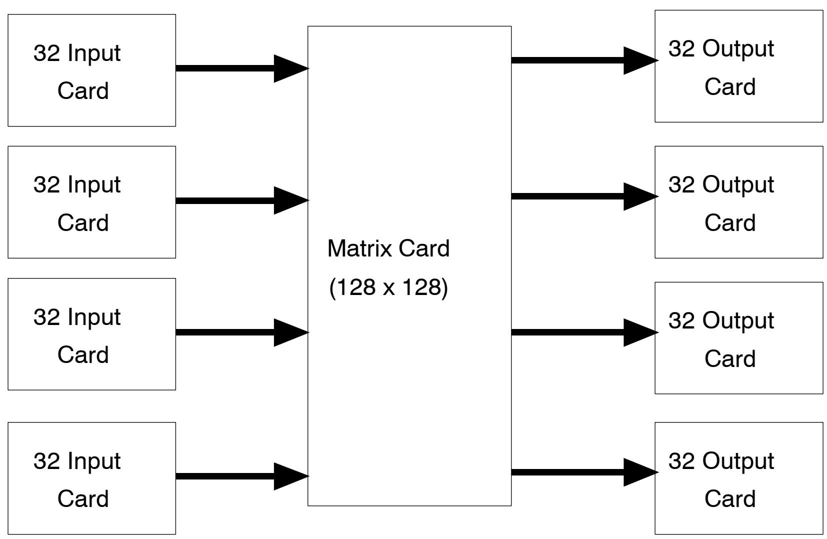
For configurations that require multiple chassis, the monitor signals are brought through a PE-33016 Port Expander used as a combiner (see page 59).

Signal Flow

Trinix is a "three-board" routing system, where the input board, output board, and matrix board are the basic modules.

Shown below is the signal flow through a 128 x 128 routing system. Inputs are received and outputs are delivered to the rear of the chassis directly with a connection to the rear panels (no cabling).

Figure 11. Input and output routing through matrix board for 128 x 128 switcher.



For a description of the various input, output, and matrix cards available for Trinix, see page 83.

Analog Processing Control

The VI-33100 "universal" input module accepts analog as well as digital signals. Adjustments for analog signals include the following:.

- Save/recall settings
- Mono mode
- Setup on/off
- Chroma kill
- Comb/trap filter
- AGC on/off
- Manual gain control
- ACC on/off
- Manual chroma control
- Insert Error Detection and Handling (EDH) data
- Contrast / Y gain
- Saturation / chroma gain
- Brightness / Y offset
- Hue / chroma phase
- Notch decode on/off (VBI)
- Chroma kill (VBI)
- Blank video (per VBI line)
- Add setup (per VBI line)
- Reserve VBI line for data
- Horizontal timing
- Detail enhancement
- Display channel status

For more information about the VI-33100 module, please refer to *Section 6-Analog Input Processing.*

Pre-wiring

All Trinix switchers are pre-wired to the size of the chassis. That is, a 128-chassis is essentially pre-wired to 128 x 128 with all rear panels and BNCs in place. The 256-chassis is pre-wired to 256 x 256. By convention, switcher sizes are shown as:

M x N (P x Q)

This indicates that the functional router size is M x N and is pre-wired to (P x Q). For Trinix pre-wiring is only possible in multiples of 128 x 128, as that is the smallest chassis size increment.

Connector Numbering

Late-model Trinix routers have video input/output connectors that begin with "1" instead of "0." An adhesive overlay set, which indicates connector groups using a 0-based numbering scheme (e.g., "Inputs 0-31," "Inputs 32-63," etc.) is provided for customers who are using a 0-based control system such as Jupiter.

Alarm System

There are two Trinix alarm classes: primary and secondary. A secondary alarm is asserted when a single fan has failed or when the secondary NR/SR Broadlinx board has taken control of the system. All other alarms (multiple fan failure, power supply failure, etc.) are considered primary alarms.

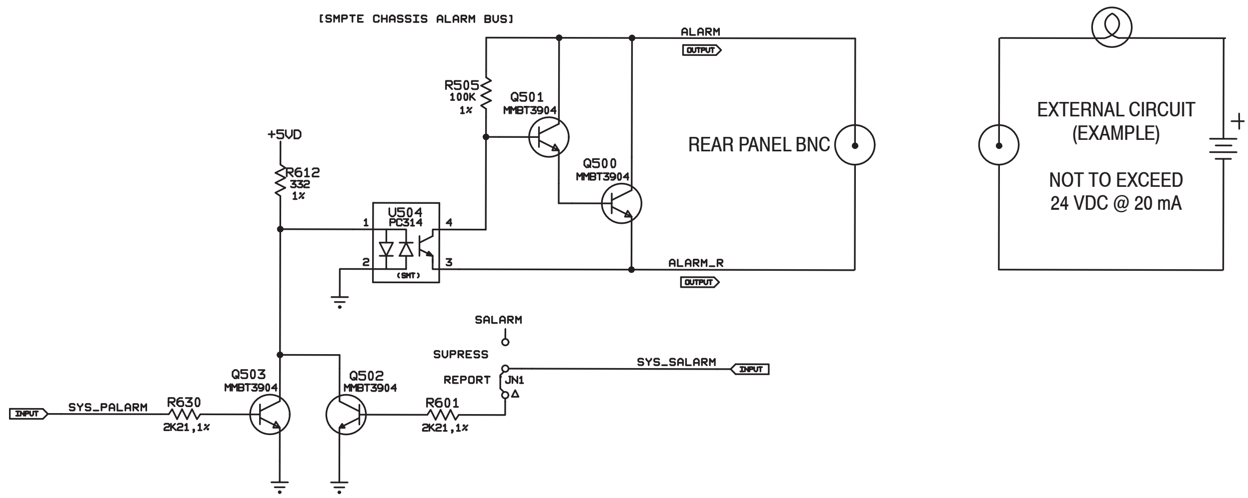
All major components include a local alarm LED. NR/SR-33000 boards have separate LEDs for primary and secondary alarms.

The master alarm indicator is a tri-color LED on the front panel ("Power/Alarm") where green indicates normal operation, red indicates a primary alarm, and amber indicates a secondary alarm.

The rear panel "Alarm" BNC can be configured to report primary alarms only or both primary and secondary alarms. The factory default configuration is to report both. (DV-33128 and DV-33256 configuration is via a jumper on the NR/SR-33000 board, as shown on page 119 and page 120. DV-33512 configuration is via a jumper on the RP-33500 512 x 512 Rear Panel board as shown on page 122.)

Electrically, the Alarm BNC operates according to SMPTE standard 269M-1999. When an alarm is asserted, the circuit associated with the Alarm connector will present a low impedance to an external current source circuit provided by the customer. See Figure 12.

Figure 12. Rear panel master alarm circuit (left) and example of customer-supplied indicator circuit (right).



All of the alarm and status information is also gathered by the Broadlinx technology to make it available to the user via web pages. For more information, see page 22.

Duplication and Expansion

Trinix routers are designed to duplicate/expand inputs and outputs using passive splitter/combiner expansion panels.

Note For Jupiter-controlled (0-based) systems, the input/output numbers in the following discussion should be decreased by one (1). For example, block 1-256 should be understood as block 0-255, etc.

Note Frame numbers are determined by the input/output blocks served by the particular frame. E.g., for a DV-33256 router, inputs 1-256 and outputs 1-256 must be connected to frame zero. For more information about frame numbering, see page 146.

Note Unused connectors should be terminated for optimum performance.

Output Duplication - Dual

The PE-33016 Port Expander is a passive, transformer-based module that can be used to provide two copies of the same signal. Functionality is bi-directional and depends on connections only; no configuration is needed. Figure 13 and Figure 14 show a splitting application. Note that the unused connectors should be terminated for optimum performance.

Figure 13.

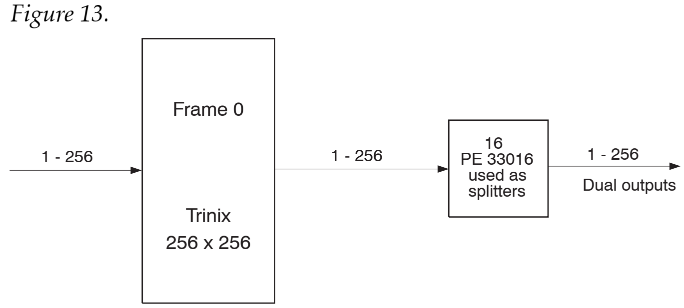
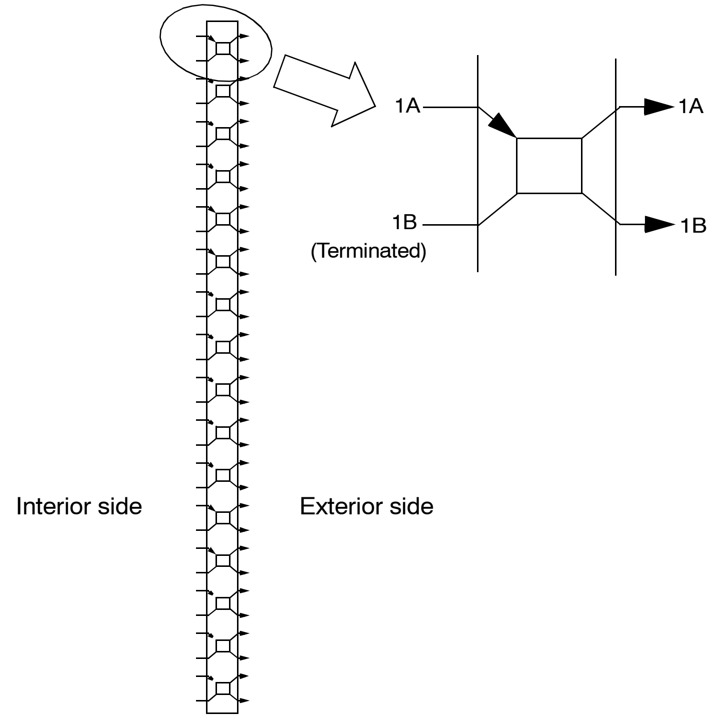


Figure 14. PE-33016 used to provide 16 dual outputs.

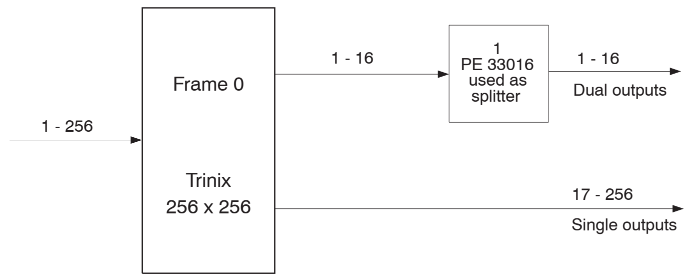


In the splitting application, the PE-33016 Port Expander can be used to provide dual outputs in groups of 16 outputs. All outputs are non-inverting. For example, a 256 x 256 router could be arranged as follows:

256 inputs x 240 single outputs and 16 dual outputs - uses 1 PE-33016
or
256 inputs x 224 single outputs and 32 dual outputs - uses 2 PE-33016s
or
256 inputs x 208 single outputs and 48 dual outputs - uses 3 PE-33016s...
etc.

Figure 15 shows a router with 240 single outputs and 16 dual outputs.

Figure 15.



In this application, 16 of the PE-33016 rear BNCs can be used for inputs (outputs from the router) and all 32 of the front BNCs can be used for outputs.[1]

Up to 16 PE-33016 modules can be mounted in the MK-33000 Mounting Kit, which is eight rack units high and approximately four inches deep. Figure 16 shows a 128 input router with a single PE-33016 mounted in an MK-33000; this provides 112 single outputs and 16 dual outputs. Figure 17 shows a 256 input router with 256 dual outputs; this arrangement requires 16 PE-33016 Port Expanders.

1. All unused connectors must be terminated. 16 terminators are supplied with each PE-33016. See page 87.

Figure 16. Use of single PE-33016 to provide dual outputs for 16 switcher outputs

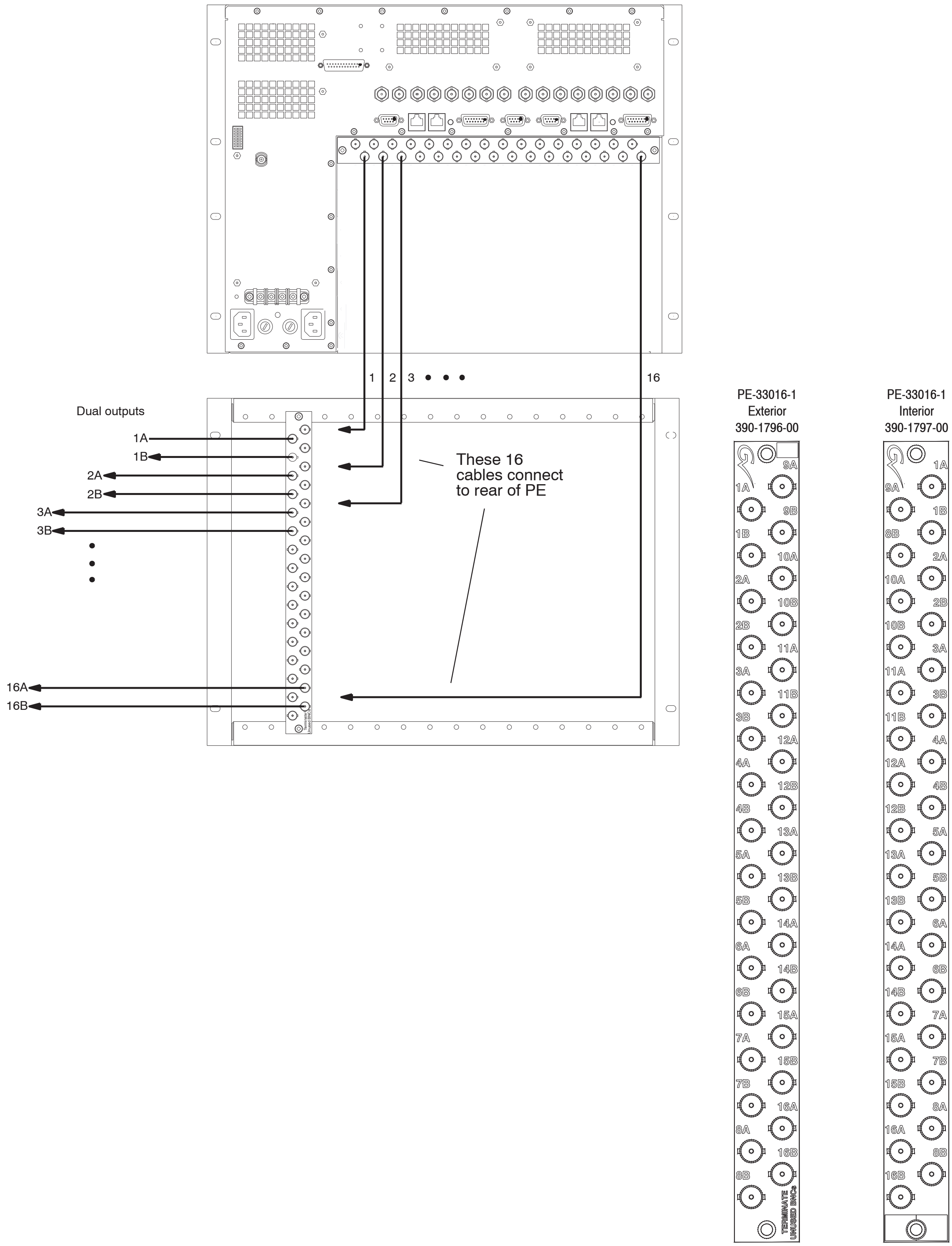
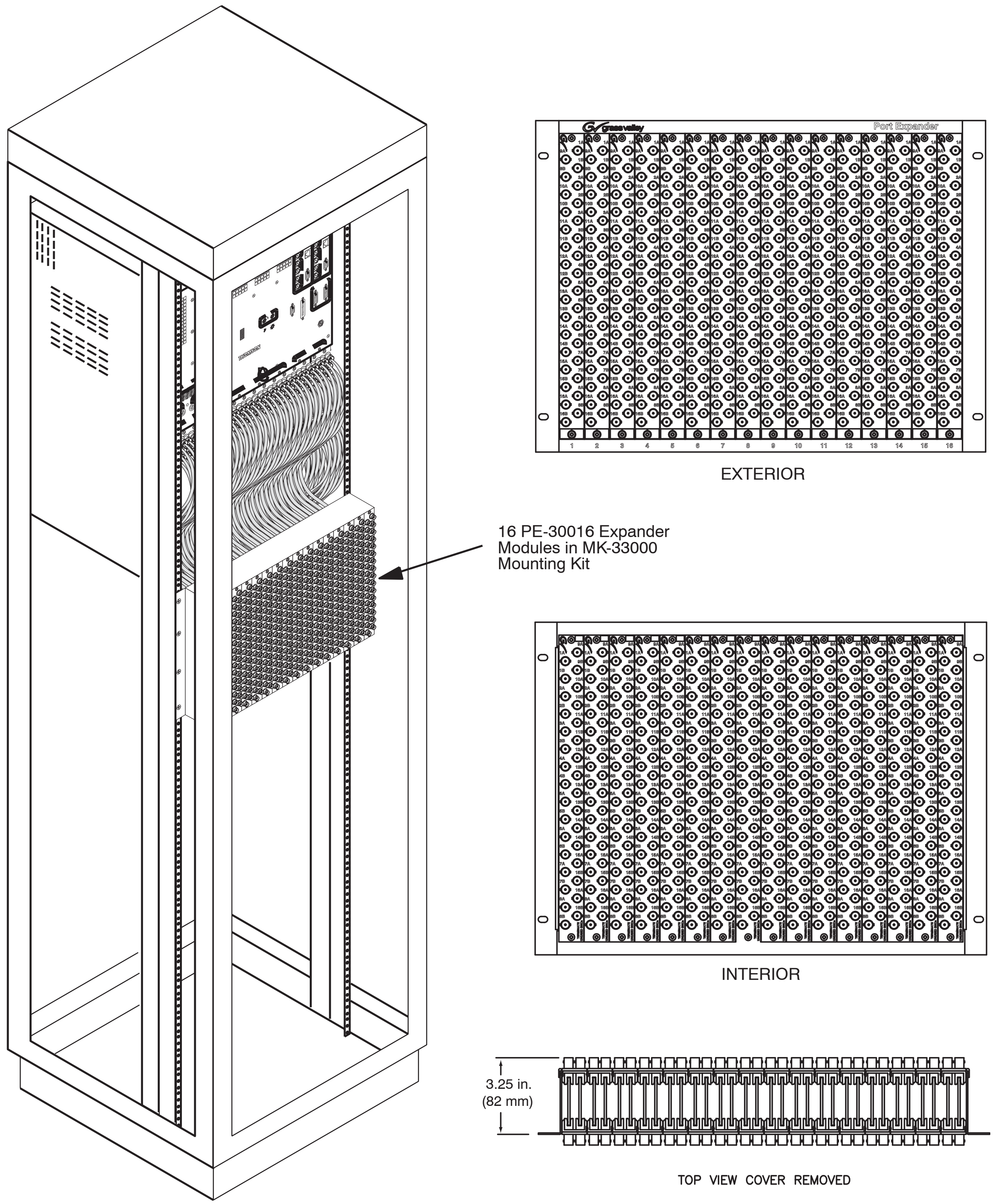


Figure 17. PE-33016 Port Expanders used to provide 256 dual outputs for 256 input switcher.



Output Duplication - Quad

The PE-33008 Port Expander can be used to provide quad outputs in groups of 16 outputs. All outputs are non-inverting. A 128 x 128 switcher could be arranged as follows:

128 inputs x 112 single outputs and 16 quad outputs - uses 2 PE-33008s
or
128 inputs x 96 single outputs and 32 quad outputs - uses 4 PE-33008s
or
128 inputs x 80 single outputs and 48 dual outputs - uses 6 PE-33008s... etc.

In this application, the eight PE-33008 rear BNCs are used for inputs (outputs from the router) and all 32 of the front BNCs are used for outputs.[1] Up to 16 PE-33008 modules can be mounted in an MK-33000 Mounting Kit, which is 8 RU high and approximately 4 inches (100 mm) deep.

1. All unused connectors must be terminated with 75 ohm terminators; for PE-33008 applications terminators must be supplied by end-user.

Figure 18 shows a 128 input router with two PE-33008s mounted in an MK-33000; this provides 112 single outputs and 16 quad outputs. A 256 input router with 128 single outputs and 128 quad outputs would appear similar to the system shown in Figure 17; this arrangement requires 16 PE-33008 Port Expanders.

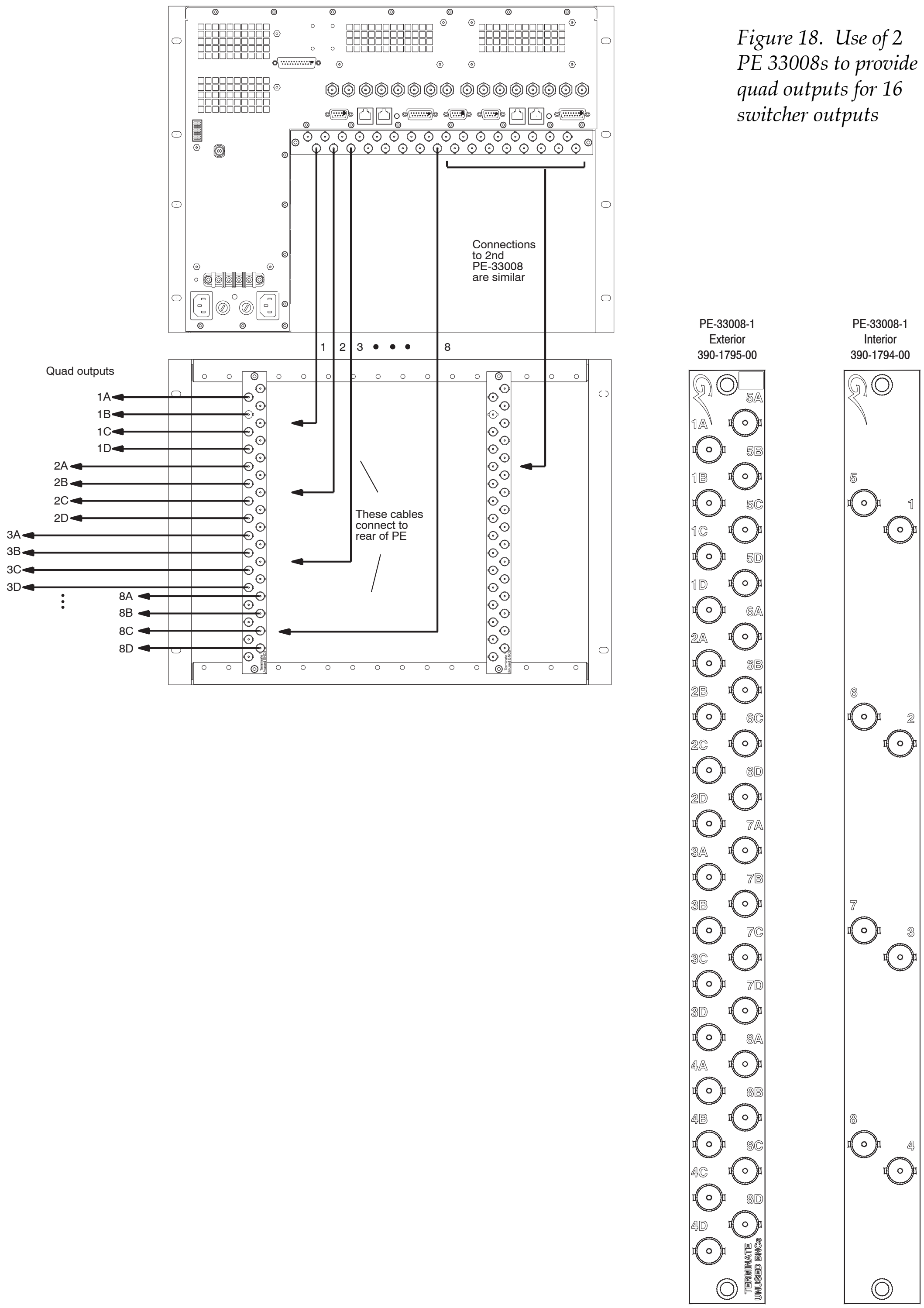
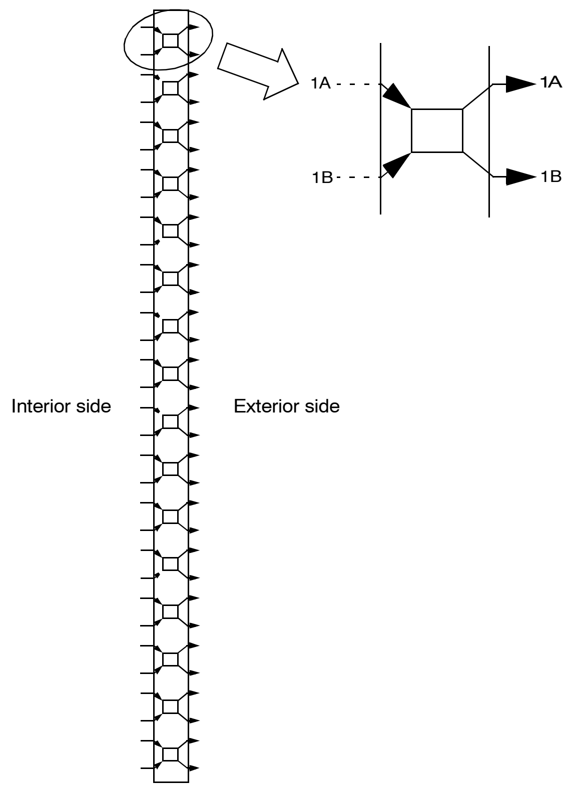


Figure 18. Use of 2 PE 33008s to provide quad outputs for 16 switcher outputs

Expanded Systems

The PE-33016 and PE-33008 Port Expanders can be used to “combine” outputs for an input expansion application. In Figure 19 and Figure 20, a PE-33016 is downstream of the router. The router will present only one of the two possible signals to each combiner, which will produce two copies of that signal. Note that any unused connectors should be terminated for optimum performance. The port expanders are mounted in an MK-33000 Mounting Kit as described previously (page 46).

Figure 19. PE-33016 used as a combiner. Only one of the input signals will be present at a time, and this signal is duplicated.

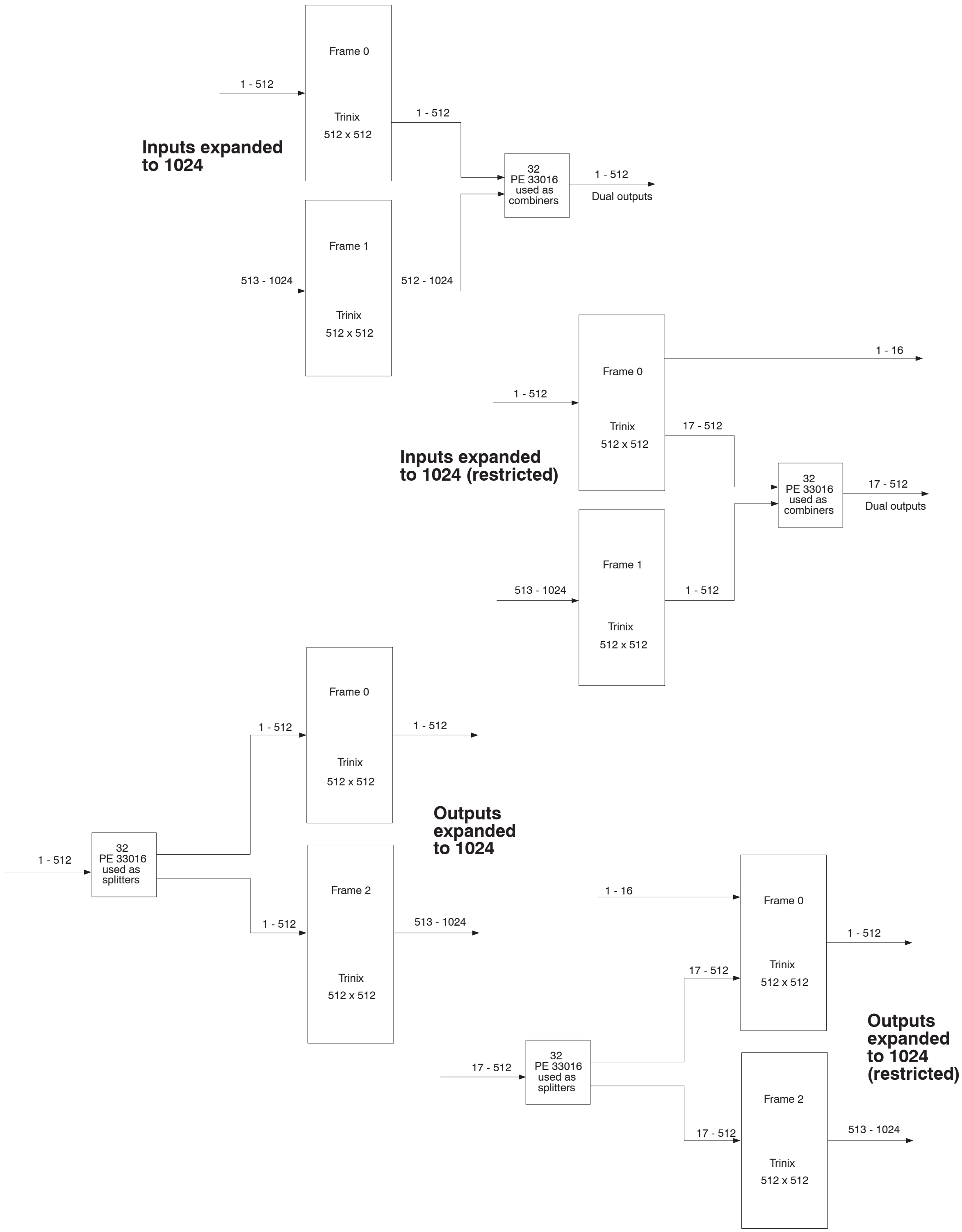


Expanded configurations include:

- 1024 inputs x 512 dual outputs
- 512 inputs x 1024 outputs
- 1024 inputs x 1024 outputs
- 1024 inputs x 1024 dual outputs
- 2048 inputs x 2048 outputs

Some of these configurations are shown on the following pages. Notice that the same port expander type is used for both downstream combining (for input expansion) and upstream splitting (for output expansion). All outputs are non-inverting.

Figure 20. Examples of input and output expansion.



The term “restricted” refers to a wiring scheme where some signal paths are not available. For example, the second system shown in Figure 20 will not allow outputs 1-16 to receive inputs 513-1024.

Figure 21. 1024 x 1024 system.

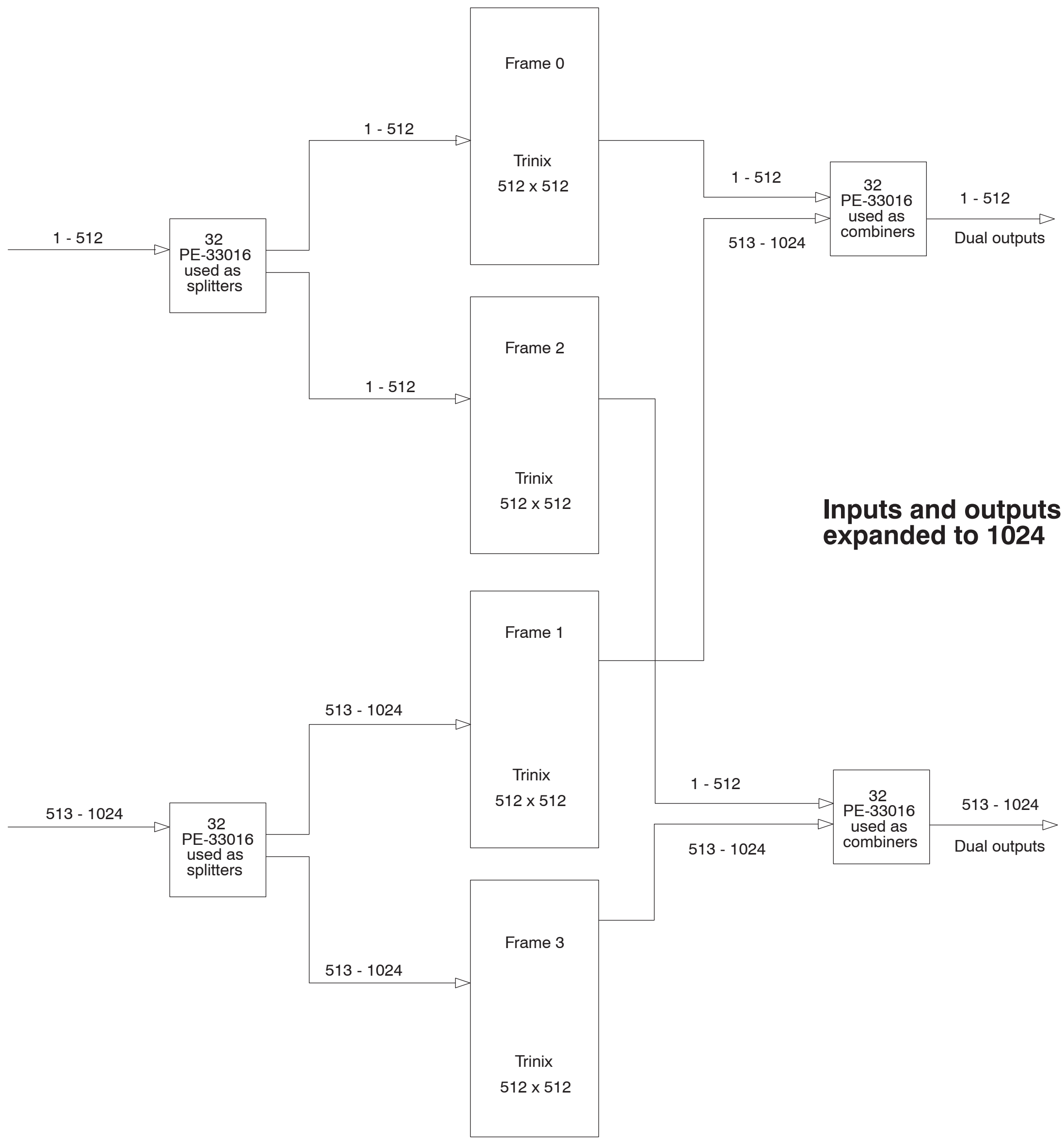


Figure 22. 1024 x 2048 system.

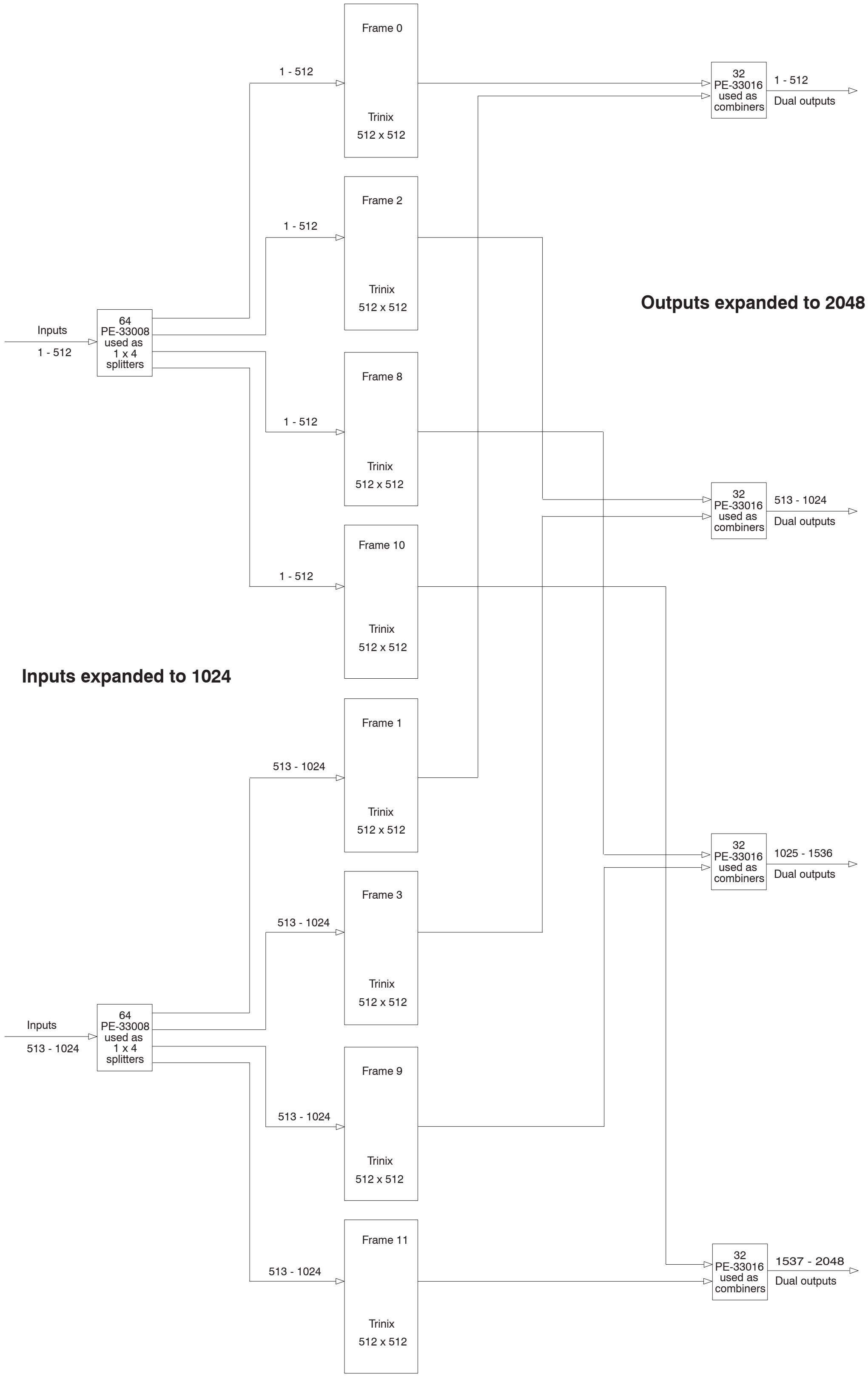


Figure 23. 2048 x 1024 system.

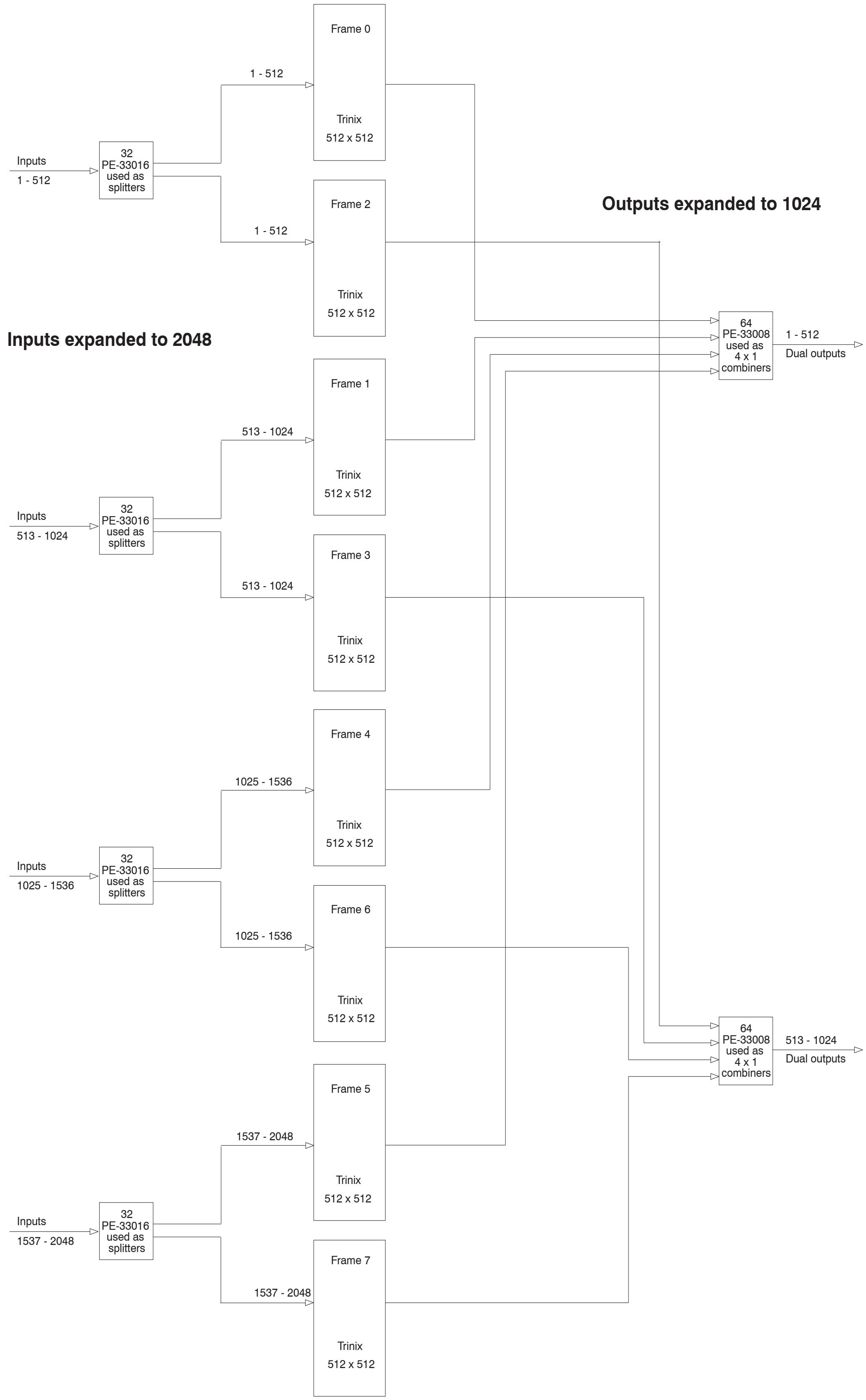
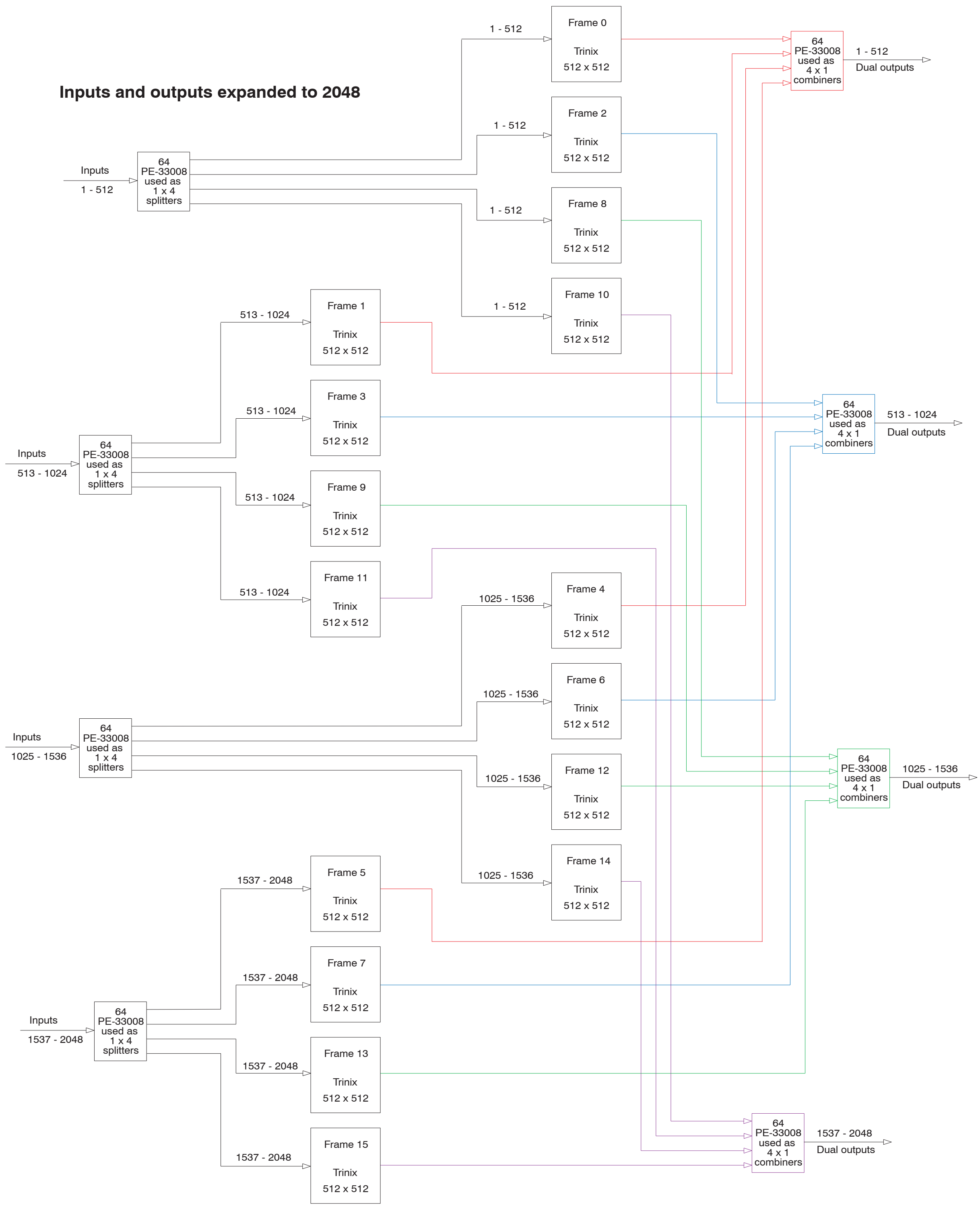


Figure 24. 2048 x 2048 system.



Termination for Pre-wired Expansion Frames

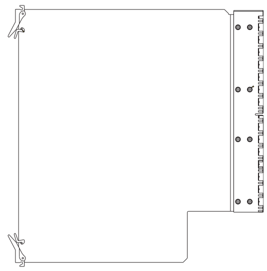


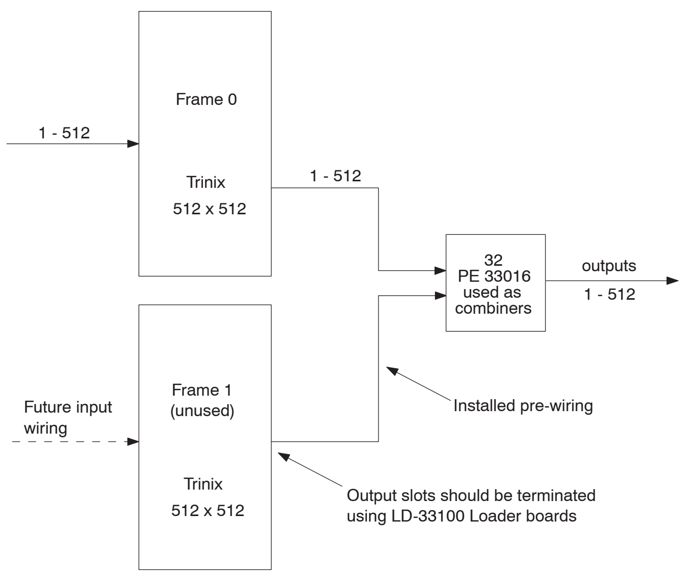
Figure 25. LD-33100 Loader board

As described above, unused BNC connectors on port expanders should be terminated for best performance. However, it may be desirable to install an empty or partially stuffed frame and associated cabling to simplify future expansion, and when such cabling connects to a port expander that is carrying active signals, special termination hardware is required. Since the presence of pre-wired cabling will not permit standard BNC terminators to be installed on the expander, an **LD-33100 Loader board** is installed in the associated frame in place of an input or output board to provide correct termination.

Input Expansion

For example, Figure 26 shows a 512 x 512 system expandable to 1024 x 512:

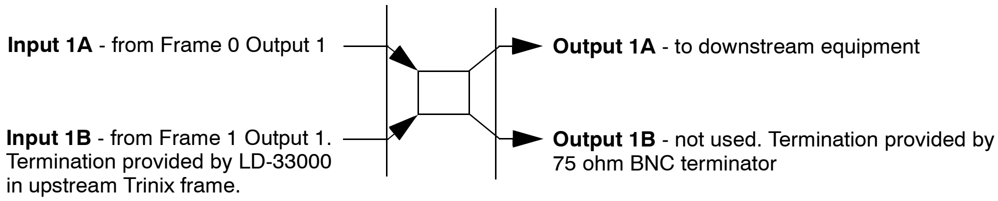
Figure 26.



Frame 1 contains no input or output boards, but wiring has already been installed between Frame 1 and the PE-331016 Port Expanders.

Now consider Output 1 of Frame 0. This signal is connected to Input 1A of the first PE-33016 Port Expander. See Figure 27.

Figure 27. Detail of one PE-33016 shown in Figure 26.



In this example:

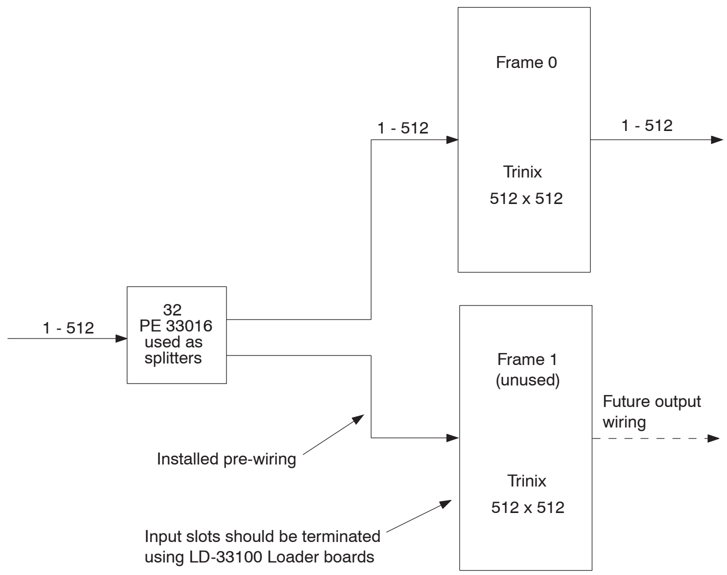
- Only Input 1A and Output 1A are presently functional.
- Following the rule that unused connectors should be terminated, Output 1B is fitted with a 75 ohm BNC terminator.
- Input 1B is pre-wired to Frame 1, so there is no place for a terminator. In this case, termination will be provided by an LD-33100 Loader board installed in output board slot "1-32" of Frame 0. Furthermore, in this example all 16 output slots of Frame 0 should have an LD-33000 installed.
- When the system is upgraded to 1024 x 512, the LD-33000 boards will be removed and replaced by output boards. Cabling to the port expanders is already in place.

The concepts in this example apply equally to systems with PE-33008 Port Expanders. For example, they would apply to a 1024 x 1024 system that is pre-wired for expansion to 2048 x 1024 (similar to the system shown on page 54, where LD-33100 Loader boards would be installed in place of output boards in Frames 4 through 7).

Output Expansion

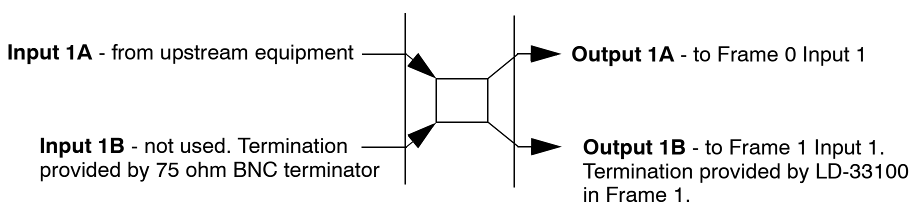
Similarly, LD-33100 Loader boards may also be used for output-expandable systems. For example, Figure 28 shows a 512 x 512 system expandable to 512 x 1024:

Figure 28.



Again, considering one signal path (Figure 29), pre-wired cable connections do not allow for installation of individual terminators. Instead, LD-33100 Loader boards are installed in the unused frame, but in this case they are installed in the input slots.

Figure 29. Detail of one PE-33016 shown in Figure 28.



Input and Output Expansion

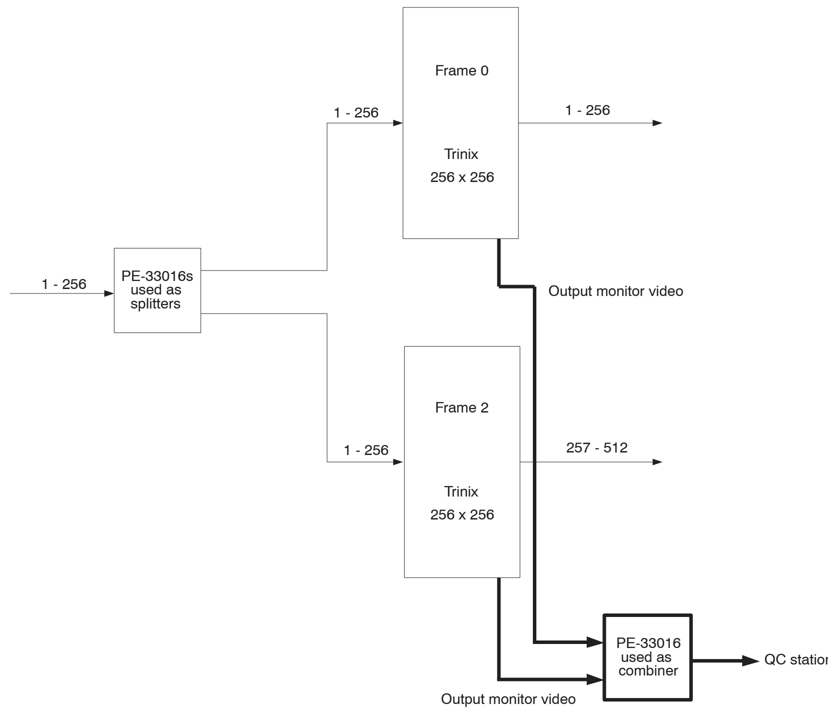
The rules just described for use of LD-33100 Loader boards will also apply to systems designed for expansion of both inputs and outputs. An example would be a 512 x 512 pre-wired for expansion to 1024 x 1024 (similar to the system shown on page 52). Only chassis 0 would be active in the 512 x 512 router, so only the port expanders connected to Frame 0 would be in use. Frame 1's inputs are connected to the top left PE; while Frame 2's outputs are connected to the top right PE. Therefore Frame 1's *input* slots would require LD-33100s and Frame 2's *output* slots would require LD-33100s. No LDs would be needed for Frame 3.

Monitoring with Expanded Systems

In expanded systems, output monitor signals must be brought through a combiner. An example of an output-expanded system in shown in Figure 30; an input-expanded system is shown in Figure 31.

Note Output monitoring is not available for input-expanded systems controlled by an SR-33000 Sync/OPM board.

Figure 30. Monitoring with output-expanded system.



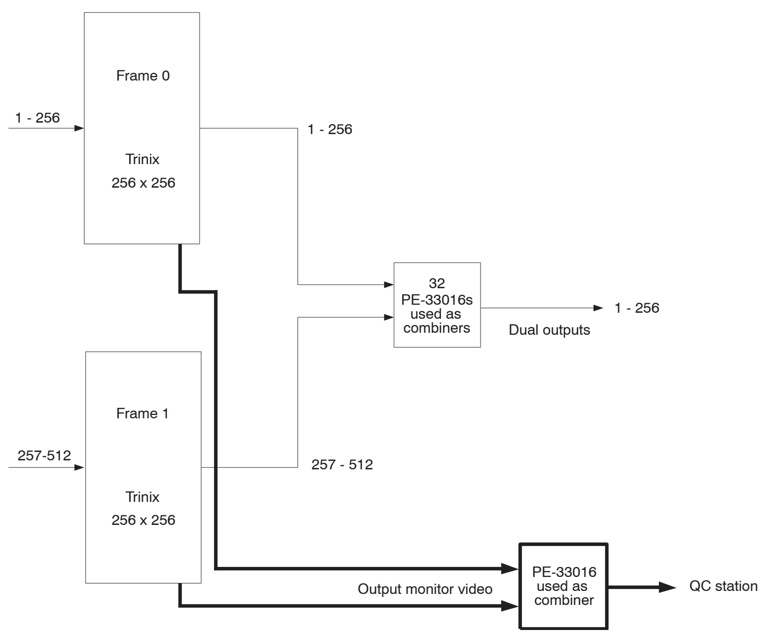


Figure 31. Monitoring with input-expanded system.

Protected Paths

Overview

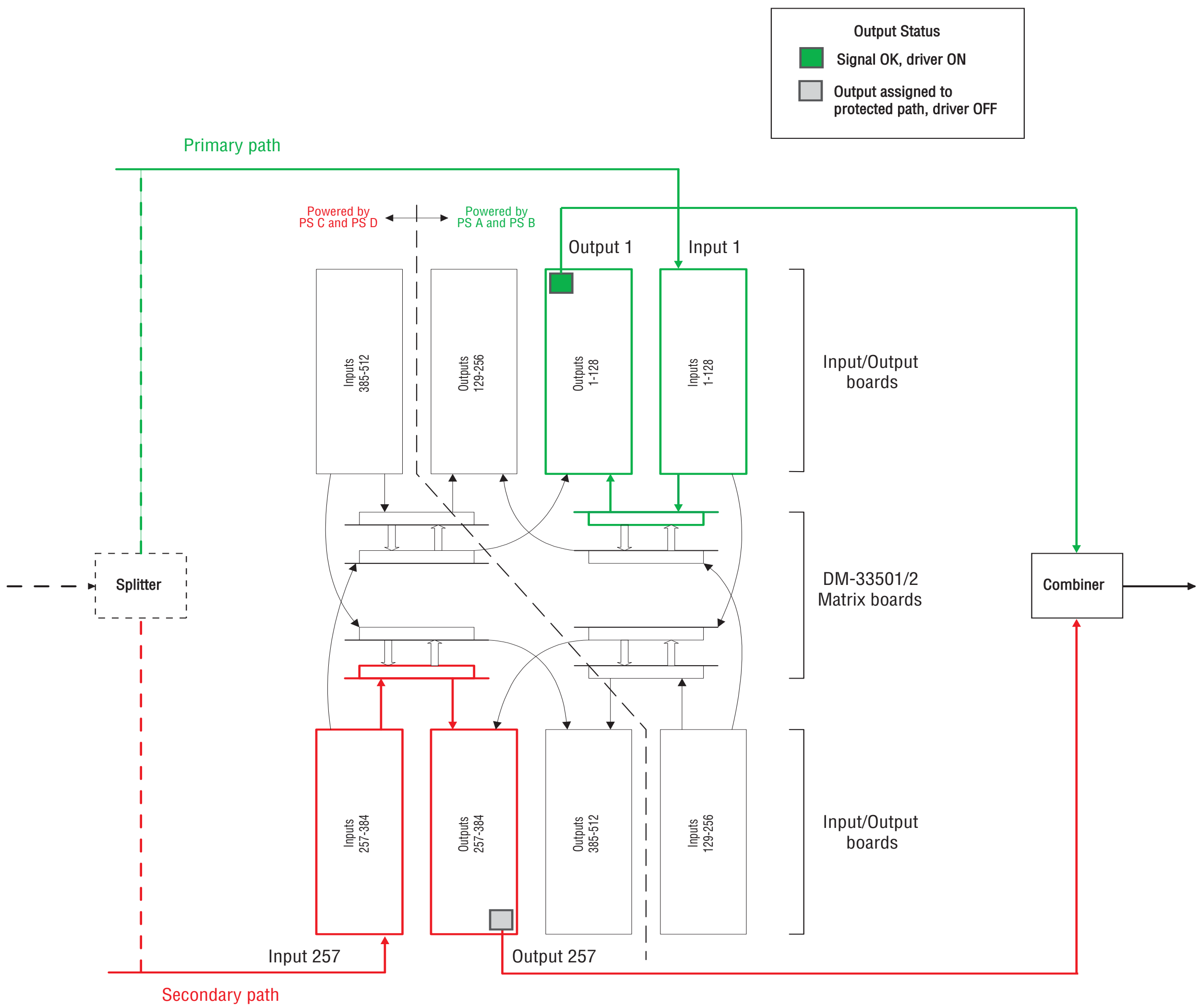
The protected path function is designed to monitor router outputs that are feeding critical downstream equipment and, in the event of signal loss, automatically select the output that is carrying the same signal and trigger the system alarm.

This function assumes the following:

- HO-33120 HD/SD Output Board(s) are providing the output signal(s) to be monitored. These boards allow individual outputs to be enabled or disabled using software controls.
- Protection is provided for *paths*, i.e., input/output *pairs*. The installer must identify critical outputs and an associated critical input for each. For redundancy, two paths must be defined: a "primary" path and a failover "secondary" path.
- Protected pairs should be hard wired to back-panel connectors that will provide the most independent possible paths through the router. For example, the two paths should use different input boards and different output boards. Depending on router size, the two paths may also be able to use different matrix boards and different power sources.
- For full redundancy, two copies of each protected *input* must be wired to the router. For example, the master control switcher output could be sent through a passive splitter upstream of the router. One copy is used for the primary path, and the other for the secondary path. If an upstream splitter is used, steps must be taken to boost the gain for the appropriate block of inputs (as described in the Trinix manual).
- The primary output and the secondary output must be wired to a passive combiner, the output of which is connected to the downstream equipment. The protected path software will automatically boost individual outputs as needed for proper gain level through the splitter. Outputs not configured for protected path operation should be set for gain levels as described in the manual. (The protected path software will override the manual settings as needed.)
- The control system (e.g. Encore or Jupiter) must be operated so that the secondary path is always ready to provide a copy of the protected signal. For example, the operator would switch the Master Control output to the transmitter on the primary path; the control system would then switch the secondary path automatically. For more information, see *Encore Configuration* on page 184 or *Jupiter Configuration* on page 189.

Figure 32 shows an example of a DV-33512 router with a pair of protected paths.(Depending on system requirements, the upstream splitter may or may not be needed.) The signal detector monitors the primary path and if necessary will disable the primary path output driver and enable the secondary path output driver. Notice that the two paths use independent sets of hardware.

Figure 32. Example of protected paths for DV-33512 router



The following discussion describes the protected path planning process.

Planning

Note The following discussion is based on a “1-based” numbering scheme. If you are using a “zero-based” numbering system, subtract “1” from all instances of input/output numbers.

DV-33512

The recommended protected path ranges for DV-33512 routers are as follows:

Table 2.

Primary path		Secondary path	
Output	Input	Output	Input
1-128	1-128	257-384	257-384

For example, to protect an output in the range 1-128, choose a corresponding input in the range 1-128; this will be the primary path. For the secondary (failover) path, choose an output in the range 257-384 and a corresponding input in the range 257-384.

Alternatively, the high-range of connectors can be used for the primary path and the low range for the secondary path, as shown in Table 3:

Table 3.

Primary path		Secondary path	
Output	Input	Output	Input
257-384	257-384	1-128	1-128

Using either of these schemes will provide the most independent possible paths through a DV-33512, i.e., the primary path will use one set of input, matrix, and output boards connected to one power source while the secondary path will use a different set of boards connected to a different power source.

Note that for a DV-33512 router the maximum number of protected paths is 256.

A more detailed example is shown in Table 4. This table shows a sequential wiring scheme for a system yet to be installed or a system where cables will be re-arranged in a symmetrical pattern in order to simplify protected path configuration.

Table 4. DV-33512 protected paths (example of sequential numbering)

Primary path				Secondary path			
Out		In		Out		In	
Name	No.	Name	No.	Name	No.	Name	No.
AirPP	1	MCPP	1	AirSP	257	MCSP	257
Sat1PP	2	StuAPP	2	Sat1SP	258	StuASP	258
Sat2PP	3	StuBPP	3	Sat2SP	259	StuBSP	259
	.		.		.		.
	.		.		.		.
	.		.		.		.
NetPP	256	MainPP	256	NetSP	512	MainSP	512

The numbers shown here correspond to the connector numbers used during router configuration (but not, in most cases, to the actual silk screen number on the rear panel itself since the silk screen numbers only run from “1” to “32.”)

In Jupiter-controlled systems, the “Name” in these tables corresponds to the “logical input/output name” and the entries in the number column correspond to the “physical” input/output number.

The next example applies to existing systems where re-arrangement of cables in a sequential pattern is not practical or desirable:

Table 5. DV-33512 protected paths (example of non-sequential numbering)

Primary path				Secondary path			
Out		In		Out		In	
Name	No.	Name	No.	Name	No.	Name	No.
AirPP	21	MCPP	12	AirSP	390	MCSP	265
Sat1PP	253	StuAPP	254	Sat1SP	413	StuASP	348
Sat2PP	109	StuBPP	98	Sat2SP	289	StuBSP	409
	.		.		.		.
	.		.		.		.
	.		.		.		.
NetPP	4	MainPP	256	NetSP	440	MainSP	454

Notice that in all cases the primary path I/O numbers are always in the 1-256 range while the secondary path I/O numbers are always in the 257-512 range.

DV-33256

Recommended protected path ranges for DV-33256 routers are as follows:

Table 6.

Primary path		Secondary path	
Out	In	Out	In
1-128	1-128	129-256	129-256

For example, to protect an output in the range 1-128, choose a corresponding input in the range 1-128; this will be the primary path. For the secondary (failover) path, choose an output in the range 129-256 and a corresponding input in the range 129-256.

This will provide the most independent possible paths through a DV-33256, i.e., the primary path will use one set of input, matrix, and output boards while the secondary path will use a different set of boards.

CAUTION With a DV-33256, it isn't possible to arrange completely independent paths, i.e., paths that use different power supplies. Protected path configuration for DV-33256 routers provides redundancy for matrix boards and input and output boards only.

Note that for a DV-33256 router the maximum number of protected paths is 128.

A more detailed example is shown in Table 7. This table shows a sequential wiring scheme for a system yet to be installed or a system where cables will be re-arranged in a symmetrical pattern in order to simplify protected path operation.

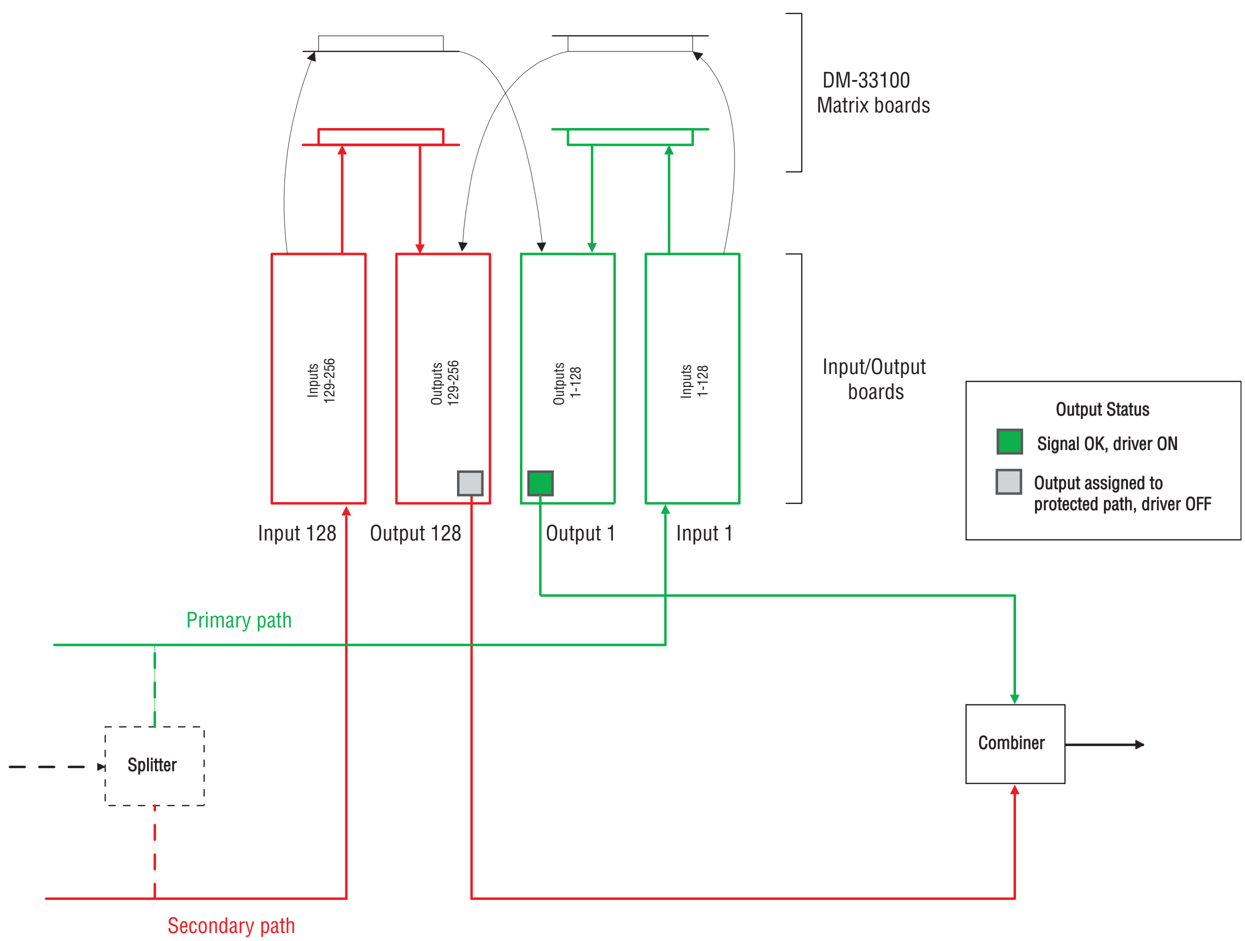
Table 7. DV-33256 protected paths (example of sequential numbering)

Primary path				Secondary path			
Out		In		Out		In	
Name	No.	Name	No.	Name	No.	Name	No.
AirPP	1	MCPP	1	AirSP	129	MCSP	129
Sat1PP	2	StuAPP	2	Sat1SP	130	StuASP	130
Sat2PP	3	StuBPP	3	Sat2SP	131	StuBSP	131
	. . .		. . .		. . .		. . .
NetPP	128	MainPP	128	NetSP	256	MainSP	256

The numbers shown here correspond to the connector numbers used during router configuration (but not, in most cases, to the actual silk screen number on the rear panel itself since the silk screen numbers only run from "1" to "32.")

In Jupiter-controlled systems, the "Name" corresponds to the "logical input/output name" and the number corresponds to the "physical" input/output number.

Figure 33. Example of protected paths for DV-33256 router



The next example applies to existing systems where re-arrangement of cables in a sequential pattern is not practical or desirable:

Table 8. DV-33256 protected paths (example of non-sequential numbering)

Primary path				Secondary path			
Out		In		Out		In	
Name	No.	Name	No.	Name	No.	Name	No.
AirPP	21	MCPP	12	AirSP	190	MCSP	165
Sat1PP	53	StuAPP	54	Sat1SP	133	StuASP	248
Sat2PP	109	StuBPP	98	Sat2SP	189	StuBSP	129
	.		.		.		.
	.		.		.		.
	.		.		.		.
NetPP	4	MainPP	56	NetSP	144	MainSP	145

Notice that in all cases the primary path I/O numbers are always in the 1-128 range while the secondary path I/O numbers are always in the 129-256 range.

DV-33128

Recommended protected path ranges for DV-33128 routers are as follows:

Table 9.

Primary path		Secondary path	
Out	In	Out	In
1-32	1-32	33-128	33-128
33-64	33-64	1-32, 65-128	1-32, 65-128
65-96	65-96	1-64, 97-128	1-64, 97-128
97-128	97-128	1-96	1-96

For example, to protect an output in the range 1-32, choose a corresponding input in the range 1-32; this will be the primary path. For the secondary (failover) path, choose an output in the range 33-128 and a corresponding input in the range 33-128.

This will provide the most independent possible paths through a DV-33128, i.e., the primary path will use one pair of input and output boards while the secondary path will use a different pair of boards.

CAUTION With a DV-33128, it isn't possible to arrange completely independent paths, i.e., paths that use different matrix boards and power supplies. Protected path configuration for DV-33128 routers provides redundancy for input and output boards only.

Note that for a DV-33128 router the maximum number of protected paths is 64.

A more detailed example is shown in Table 10. This table shows a sequential wiring scheme for a system yet to be installed or a system where cables will be re-arranged in a symmetrical pattern in order to simplify protected path operation.

Table 10. DV-33128 protected paths (example of sequential numbering)

Primary path				Secondary path			
Out		In		Out		In	
Name	No.	Name	No.	Name	No.	Name	No.
AirPP	1	MCPP	1	AirSP	33	MCSP	33
Sat1PP	2	StuAPP	2	Sat1SP	34	StuASP	34
Sat2PP	3	StuBPP	3	Sat2SP	35	StuBSP	35
	.		.		.		.
	.		.		.		.
	.		.		.		.
NetPP	64	MainPP	64	NetSP	128	MainSP	128

The numbers shown here correspond to the connector numbers used during router configuration (but not, in most cases, to the actual silk screen number on the rear panel itself since the silk screen numbers only run from “1” to “32.”)

In Jupiter-controlled systems, the “Name” corresponds to the “logical input/output name” and the number corresponds to the “physical” input/output number.

The next example applies to existing systems where re-arrangement of cables in a sequential pattern is not practical or desirable:

Table 11. DV-33128 protected paths (example of non-sequential numbering)

Primary path				Secondary path			
Out		In		Out		In	
Name	No.	Name	No.	Name	No.	Name	No.
AirPP	21	MCPP	12	AirSP	33	MCSP	33
Sat1PP	53	StuAPP	54	Sat1SP	1	StuASP	1
Sat2PP	109	StuBPP	95	Sat2SP	96	StuBSP	64

Notice that I/O numbers conform to the ranges shown in Table 9.

Worksheet for Protected Path Implementation

Based on the preceding examples, specific primary and secondary paths should be identified and noted. The following worksheet is provided for this purpose.

Table 12. Protected paths worksheet

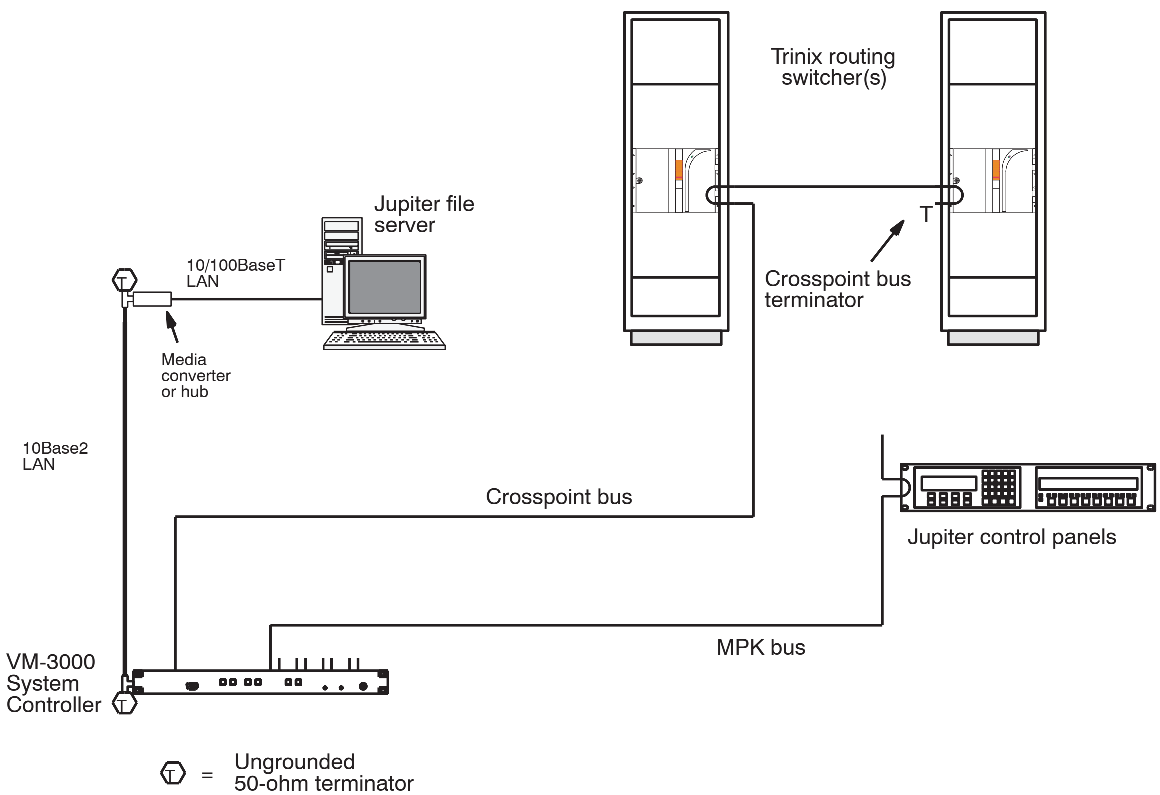
Primary path				Secondary path			
Output		Input		Output		Input	
Name	No.	Name	No.	Name	No.	Name	No.

Control Systems

Jupiter Facility Control System

The Jupiter control system can be used to operate the Trinix router using a VM-3000 or CM-4000 System Controller (Figure 34). The VM/CM can receive switching commands from a variety of serial sources, including Jupiter control panels or an automation computer.

Figure 34. Control connections to Jupiter Facility Control System (example).



In this application, the Trinix is operated in the "external crossspoint bus control" mode, during which the Broadlinx board releases control of the crosspoint bus. Switch commands arriving at the crosspoint bus connector on the rear of the chassis will be executed.

CC-2010 Matrix (Crosspoint Bus) Cable

Connection from a Jupiter VM-3000 or CM-4000 System Controller is via a crosspoint bus cable, which can be supplied in 3, 10, 25, or 50 foot lengths. The crosspoint bus connector is looped out in order to connect the bus to the next item under crosspoint control.

Depending on the size of the switcher this bus may require intermediate buffering through a CB-3000 Control Buffer. A CB 3000 is required in the following cases:

DV-33128 - eight or more chassis
DV-33256 - four or more chassis
DV-33512 - two or more chassis

The CB-3000 is described in detail in the Jupiter Installation and Operating manual.

In Trinix applications, the crosspoint bus **must be terminated** at the point farthest from the control processor using a Crosspoint Bus Terminator, part number 01-053050-001.

The CC-2010 is a 10-conductor (plus ground) cable. Ready-made cables, with installed 15-pin D male connectors, are available from Grass Valley; see page 88.

All rear-panel crosspoint bus connectors are 15-pin D, female.

For those who wish to prepare their own cables, pin-outs are shown on page 150. The cable itself should be Belden 9505 or equivalent. User-supplied matrix cables for VDE installations require a ferrite core over each end of the cable, adjacent to the connector. Details concerning ferrite cores are given on page 150.

Jupiter Control System Installation

Refer to the Jupiter VM-3000 System Controller Installation and Operation Manual, part no. 071 8305 xx or the Jupiter CM-4000 System Controller Installation and Operation Manual, part no. 071 8261 xx for control system installation details.

SMS 7000 / Encore Control

These control systems use an Ethernet connection to the Broadlinx application, which runs on the NR-33000 Sync/NIC/OPM board.

The system is operated in the "internal crosspoint bus control" mode, during which the Broadlinx board sends commands to the crosspoint bus.

LAN components are described below.

Refer to the SMS 7000 or Encore documentation for control system planning information.

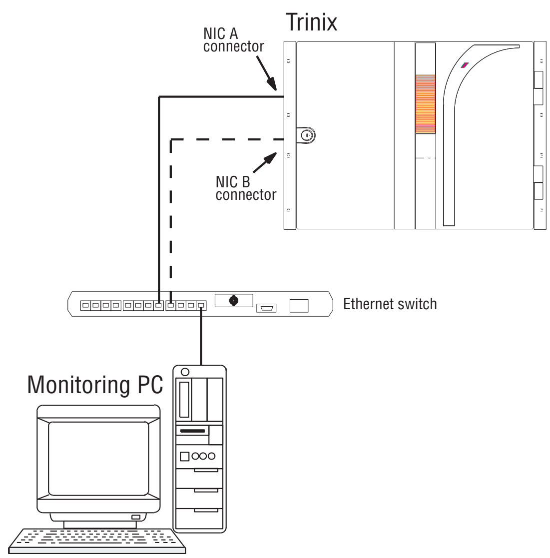
LAN and Com Bus Connections

The LAN (NIC) connections use a standard 10/100BaseT twisted pair cable with RJ-45 connectors (Cat 5E Enhanced is recommended). Shielded cable is also recommended, maximum length 60 meters.[1] Maximum length for unshielded cable is 100 meters.

LAN Monitoring Only (Jupiter Control)

In this arrangement the router is under Jupiter control and the only purpose of the connection is LAN monitoring using Broadlinx web pages or SNMP. See Figure 35.

Figure 35. LAN connections for LAN monitoring only (Jupiter Control)



If you plan on using a secondary Broadlinx board another Ethernet cable must be connected from the “NIC B” jack to the network switch.

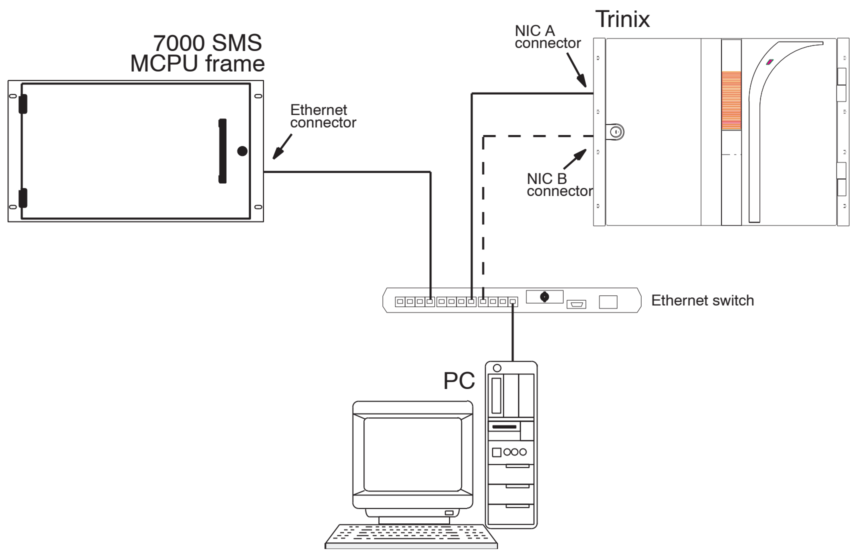
If the Trinix LAN is connected to the Internet the connection should be made through a firewall.

[1] Compliance with EEC, EMC, EN series, UL- 1950, and CSA C22.2 No. 950-M89 standards requires use of a shielded cable.

SMS Control

In this arrangement the router is under SMS control via a LAN connection. The PC is used to configure the SMS and is also available for Broadlinx or SNMP monitoring. See Figure 36.

Figure 36. SMS connections to Trinix.



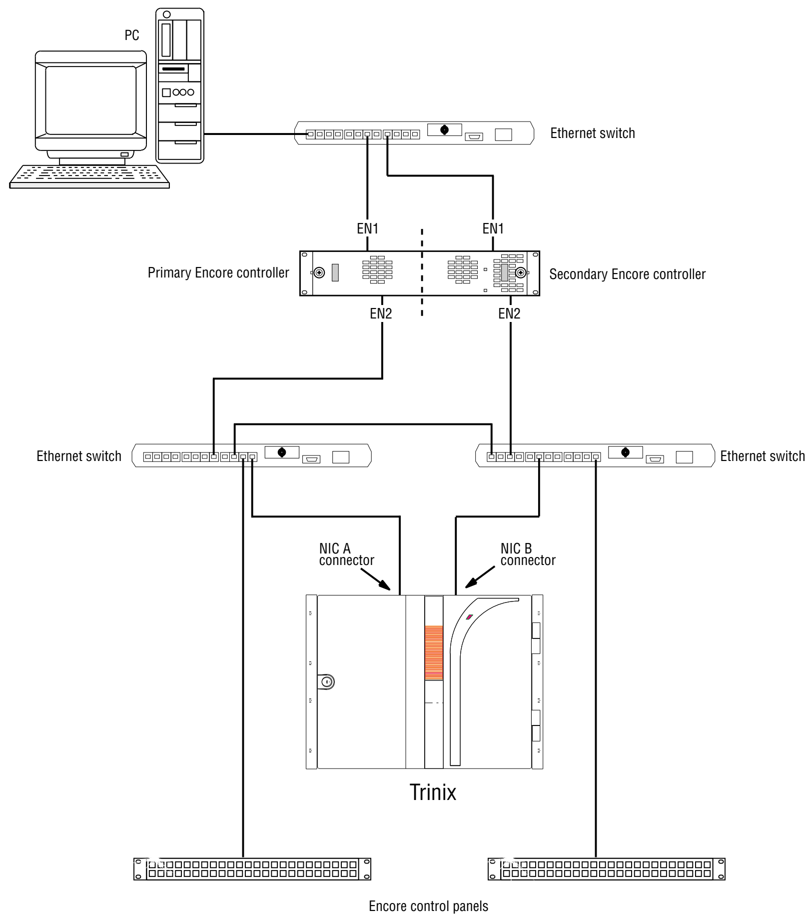
If you plan on using a secondary NR-33000 board another Ethernet cable must be connected from the “NIC B” jack to the network switch.

If the Trinix LAN is connected to the Internet the connection should be made through a firewall.

Encore Control

In this arrangement the router is under Encore control via a LAN connection. The PC is used to configure the Encore and is also available for Broadlinx or SNMP monitoring. Figure 37 shows the recommended connections when the system is equipped with redundant NR-33000 boards and redundant Encore controllers.

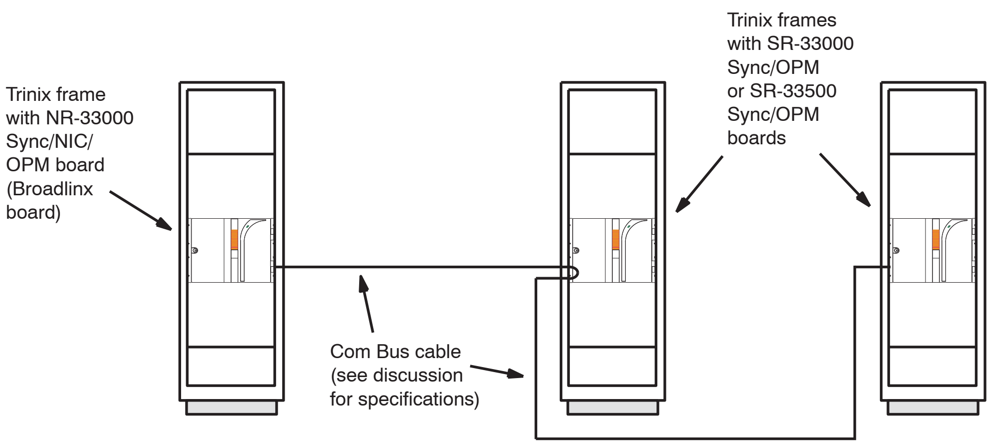
Figure 37. Encore connections to Trinix



Com Bus

In multi-frame systems, a "Com Bus" is used to loop through each frame, up to a maximum of four. The Com Bus is intended to provide switcher monitoring of multiple frames using Broadlinx web pages or SNMP. The Com Bus uses a 10/100BaseT (Cat 5 twisted pair) cable with RJ-45 connectors. Shielded cable is recommended, maximum length 60 meters.[1] Maximum length for unshielded cable is 100 meters.

Figure 38.



In **DV-33512** systems, if the power supply chassis is equipped with an NR-33000 Broadlinx board, a Cat 5 twisted pair cable must be installed between the power supply chassis Com Bus connector associated with the NR board and one of the main chassis Com Bus connectors.

If there are additional DV-33512 main frames in the system, and they do not have Broadlinx boards, then the Com Bus should be daisy-chained to those frames also.

For an illustration, see page 102.

1. Compliance with EEC, EMC, EN series, UL- 1950, and CSA C22.2 No. 950-M89 standards requires use of a shielded cable.

System Monitoring Applications

For a detailed description of Broadlinx web page monitoring using Internet Explorer, see *Broadlinx / Internet Explorer Monitoring* on page 166.

For a brief description of system monitoring using SNMP/NetCentral, see *SNMP/NetCentral Monitoring* on page 23.

Specifications

Electrical

General

Connectors:	75 ohm BNC
Input cards:	32 inputs each.
Output cards:	32 outputs each.
Matrix cards:	DM-33100: 128 inputs x 128 outputs. DM-33512: 256 inputs x 256 outputs. For additional information about the various input, output, and matrix cards available for Trinix, see page 83.

Video Inputs

Level:	800 mV p-p (+/-10%) 75 ohm terminating
Return loss:	HD: >/=15 dB from 5 MHz to 1.5 GHz SD: >/=15 dB from 5 MHz to 540 MHz

Sync Inputs

Level:	Nominal 1 Vp-p (+/-6 dB) video or black burst. Tri-level sync also accepted
Video standard:	NTSC/PAL/HDTV, auto-detected
Return loss:	>/=40 dB from 100 kHz to 20 MHz >/=30 dB from 20 MHz to 30 MHz

Video Outputs

Level:	800 mV p-p +/-10% 75 ohm
Return loss:	>/=15 dB from 5 MHz to 1.5 GHz (except Monitor outputs)

Performance Characteristics

Maximum data rate:	1.5 Gbps
Minimum data rate:	3.072 Mbps
Signal standards:	SMPTE 292M-1998,[1] SMPTE 259M-1997[1] (Output rise and fall times correspond to SMPTE 292M)
Equalization:	SI-33110 Input Card (SD): automatic up to 300 meters of Belden 1694A, 250 meters of Belden 8281 or equivalent coax cable for SD equalizer at 270 Mbps. Reducing to 150 meters at 540 Mbps.

1. See Glossary

HI-33110 Input Card (SD/HD): automatic up to 100 meters of Belden 1694A or equivalent coax cable.

VI-33100 Input Card (SD/HD): For digital SD operation, automatic up to 300 meters of Belden 1694A or equivalent coax cable. For HD operation, automatic up to 100 meters of Belden 1694A or equivalent coax cable.

HI-33200 Input Card (SD/HD): For SD operation, automatic up to 300 meters of Belden 1694A or equivalent coax cable. For HD operation, automatic up to 100 meters of Belden 1694A or equivalent coax cable.

Data reclocking: Switch selectable on an output-by-output basis.
The HO-33110 Output Board provides individual selection of reclocking for 1.485 Gbps or non-reclocking for all data rates.
The HO-33120 Output Board provides individual selection of reclocking On or Off for the supported data rates. The data rate for reclocking is automatically selected by the circuitry on the board for 1.485 Gbps, 540 Mbps, 360 Mbps, 270 Mbps, 177 Mbps, and 143 Mbps. Other data rates will not be reclocked.
The SO-33110 Output Board is non-reclocking.

Output jitter: </= 0.2 unit interval

AC Power Input

Mains connection: IEC Connector, separate mains input for each power supply module

Voltage range: 100-240 VAC 50-60 Hz, universal, auto-ranging (fuses must be selected and installed as appropriate for mains voltage)

Operating current 128 x 128 frame: approx. 5.36 A @ 100 VAC, approx. 2.23 A @ 240 VAC.
256 x 256 frame: approx. 9.36 A @ 100 VAC, approx. 3.90 A @ 240 VAC
512 x 512 frame: approx. 19.08 A @ 100 VAC; approx. 7.63 A @ 240 VAC

Inrush current 128 x 128 frame: 49.05 A
256 x 256 frame: 55.0 A
512 x 512 frame: 45 A

Hold-up time: Minimum 20 msec at full load

Conducted emissions: per FCC Class B, EN55022 Class B

Power Supply DC Output

Voltage: +48 (+/-0.5) VDC

Current: 128 x 128 frame: 12.5 A/supply (full redundancy).

	256 x 256 frame: 26 A / supply (full redundancy). 512 x 512 frame: approx. 26 A / supply (full redundancy).
Current sharing:	Yes, maximum 20% differential unbalance
Ripple/noise:	<200 mVp-p

DC Power Input

Input voltage range	42-54 VDC
Operating current	128 x 128 frame: approx. 9.5 A @ 48 VDC. 256 x 256 frame: approx. 16 A @ 48 VDC. 512 x 512 frame: approx. 34 A @ 48 VDC.
Inrush current	128 x 128 frame: 15 A. 256 x 256 frame: 21 A. 512 x 512 frame: approx. 25 A.

Alarm

The relay connector is a BNC type and meets SMPTE 269M-1999 (see Glossary).

Environmental

0 to +35 degrees C (+32 to +95 F)

Physical

128 x 128 frame

14 inches (8 RU) high x 19 in. wide x 17.50 in. deep (356 x 483 x 445 mm)

256 x 256 frame

26.25 inches (15 RU) high x 19 in. wide x 17.5 in. deep (667 x 483 x 445 mm)

512 x 512 frame

Main chassis: 49 inches (28 RU) high x 19 in. wide x 17.5 in. deep (1245 x 483 x 445 mm)Power supply chassis: 7 inches (4 RU) high x 19 in. wide x 21 in. deep (178 x 483 x 533 mm)

MK-33000 Mounting Kit (for port expansion)

14 inches (8 RU) high x 19 in. wide x approximately 4 in. deep (356 x 483 x 100 mm)

Configuration

Quick Look

Building block size: 32 Inputs or 32 Outputs
Options: SD or HD rate I/O modules
Dual outputs, quad outputs
Additional monitor outputs (2)
Redundant sync inputs (2)
Redundant monitor/status/control
Redundant power supplies
Standards supported: SMPTE 259M-1997, SMPTE 292M-1998
Standard connectors: 75-Ohm BNC
Output monitor: Yes, 2 standard
Sync reference input: Yes, 2. Granularity: per 32 outputs
Control options: Jupiter, SMS 7000, Encore

Chassis, Board, Weight and Power Summary for Select Matrix Sizes

Table 13.

Matrix Size	32 x 32	64 x 64	96 x 96	128 x 128	160 x 160	192 x 192	224 x 224	256 x 256
	128 Chassis				256 Chassis			
# of Chassis	1	1	1	1	1	1	1	1
# Input Boards	1	2	3	4	5	6	7	8
# Output Boards	1	2	3	4	5	6	7	8
# of Matrix Boards	1	1	1	1	4	4	4	4
Weight in pounds (kilograms)	75 (34)	81 (37)	88 (40)	94 (43)	163 (74)	169 (77)	176 (80)	182 (83)
Power Consumption* (W)	~350	~400	~440	~480	~850	~900	~950	~1000

*Approximate

Table 14.

Matrix Size	256 x 256	256 x 512		512 x 256	512 x 512	512 x 768	512 x 1024
	512 Chassis						
# of Chassis	1	1		1	1	2	2
# Input Boards	8	8		16	16	32	32
# Output Boards	8	16		8	16	24	32
# of Matrix Boards	1	2		2	4	6	8
Weight* in pounds (kilograms)	~300 (~140)	~350 (~160)		~350 (~160)	~400 (~180)	~750 (~340)	~800 (~360)
# of RUs	32	32		32	32	64	64
Power Consumption* (W)	~1000	~1400		~1600	~2000	~3500	~4000

Table 15.

Matrix Size	768 x 512	768 x 768		1024 x 512	1024 x 1024			2048 x 2048
	512 Chassis							
# of Chassis	2	4		2	4			16
# Input Boards	24	48		32	64			256
# Output Boards	32	48		32	64			256
# of Matrix Boards	6	9		8	16			64
Weight* in pounds (kilograms)	~750 (~340)	~1400 (~640)		~800 (~360)	~1600 (~730)			~6400 (~2900)
# of RUs	64	192		64	192			512
Power Consumption* (W)	~4000	~6000		~4000	~8000			~32000

*Approximate

Ordering Information

Trinix routing systems are ordered as a base frame; a set of input, output, and matrix boards; and options.

Frames

TRX-DV-33128

128 x 277P MAESTRO.xls128 Frame with 1 PS, 1 Broadlinx, 2 Fan Modules. 8 RU

TRX-DV-33256

256 x 256 Frame with 1 PS, 1 Broadlinx, 3 Fan Modules. 15 RU

TRX-DV-33512

512 x 512 Frame with 2 PS, 1 Broadlinx, 6 Fan Modules. 32 RU

Input, Output, and Matrix Boards

Input and output boards each have 32 inputs or outputs and can be grouped into SD and HD blocks within a frame. The matrix board is available in two sizes.

TRX-SI-33110

SD Input Module - consists of a 16-input base board (SI-33110) and a 16-input mezzanine board (SI-33011), providing 32 inputs. Supports data rates of 3 to 540 Mbps. A "gain cell" is included on this board to be used in conjunction with the port expanders in order to create multi-chassis routers.

TRX-HI-33200

SD/HD Input Module - consists of a 16-input base board (HI-33200) and a 16-input mezzanine board (HI-33201), providing 32 inputs. The module supports data rates of 3 Mbps to 1.485 Gbps. A "gain cell" is included on this board to be used in conjunction with the port expanders in order to create multi-chassis routers.

TRX-VI-33100

Video Input Module - consists of a 16-input "universal" base board (VI-33100) and a 16-input digital-only mezzanine board (HI-33201), providing 32 inputs.

- The VI-33100 Universal base board auto-senses and accepts 16 composite analog SD, digital SD, or digital HD signals in any combination and passes them in digital SD or digital HD form (as appropriate) to the Trinix matrix board. When analog signals are received, an extensive set of gain, phase, filtering, and other adjustments are available for each signal. For a list of these adjustments, see page 40.

- The HI-33201 SD/HD Digital Input mezzanine board auto-senses and accepts a second set of 16 digital SD or digital HD signals in any combination and passes them in digital SD or digital HD form (as appropriate) to the Trinix matrix board.

TRX-HI-33200

SD/HD Digital Input Module - consists of a 16 input base board (HI-33200) and a 16 input mezzanine board (HI-33201), providing a total of 32 inputs. Each board auto-senses and accepts 16 digital SD or digital HD signals in any combination and passes them in digital SD or digital HD form (as appropriate) to the Trinix matrix board. The TRX-HI-33200 is similar to the TRX-VI-33100 but is not fully stuffed.

TRX-SO-33110

SD Output Module, non-reclocked - consists of a 16 output base board (SO-33110) and a 16 output mezzanine board (SO-33011), providing a total of 32 outputs.

A "gain cell" is included on this board to be used in conjunction with the port expanders in order to create multi-chassis routers as well as dual or quad outputs. A switch is included to select one of four synchronizing inputs.

TRX-HO-33110

HD Output Board, 1.5 G reclocked - consists of a 16 output base board (HO-33110) and a 16 output mezzanine board (HO-33011), providing a total of 32 outputs.

Each output can be set for Auto Detect "ON" or "OFF." When Auto Detect is ON the signal will be checked to see if it is a valid HD signal running at 1.485 Gbps; if so, the signal will be reclocked; if not, it will be bypassed. When Auto Detect is OFF the output signal is never reclocked. A "gain cell" is included on this board to be used in conjunction with the port expanders in order to create multi-chassis routers as well as dual or quad outputs. A switch is included to select one of four synchronizing inputs.

TRX-HO-33120

Universal Output Module, multi-rate reclocker - consists of a 16-output base board (HO-33120) and a 16-output mezzanine board (HO-33121).

Each output can be set for Auto Detect "ON" or "OFF." When Auto Detect is ON the signal will be checked to see if it is a valid HD or SD signal running at a supported data rate; if so, the signal will be reclocked; if not, it will be bypassed. When Auto Detect is OFF the output signal is never reclocked. A "gain cell" is included on this board to be used in conjunction with the port expanders in order to create multi-chassis routers as well as dual or quad outputs. A switch is included to select one of four synchronizing inputs. A list of data rates supported by the HO-33120 Output Board is shown on page 79.

Protected path operation requires HO-33120 Output Modules in the paths to be protected.

TRX-DM-33100

Digital Matrix Board - 128 x 128 for use with 128 and 256 frame

Contains 32 instantiations of a 32 x 16 crosspoint IC. It handles both SD and HD data rates and is used in both the 128 and 256 chassis. It has a memory refresh circuit which is used to keep the configuration of the crosspoints in the event of some power interruption to the controlling element. One card is needed for all configurations in the 128 chassis and 1, 2, or 4 are needed for the 256 chassis depending on the needed matrix size.

TRX-DM-33512

Digital Matrix Board - 256 x 256 for use with 512 frame

This module consists of two circuit boards interconnected, each with a 256 x 128 matrix function. The matrix board uses redundant power-conditioning circuitry and 144 x 144 crosspoint ICs (used as 128 x 128) each with its own control circuit. A 512-chassis, fully stuffed to 512 x 512 inputs and outputs, requires four of these modules.

Options

Additional video signal cards

Additional input, output, and matrix cards can be selected for spares or an additional level of signal routing.

Power Supplies and Fans

A redundant power supply and spare can be added if desired.

TRX-PS-33100

Power Supply - 128 frame

TRX-PS-33200

Power Supply - 256 and 512 frame

TRX-FM-33000

Fan Module

NIC/Sync/OPM Boards

TRX-BL-33000

Broadlinx board- consists of one NR-33000 NIC/Sync/OPM board and associated software; combines synchronization, network interface, and output monitoring functions.

Requires TRX-CTRL-CPL for SMS 7000 / Encore control or TRX-CTRL-XPT for Jupiter control.

Sync Functions: The BL-33000 includes two sync-reference inputs, which can be NTSC, PAL or Tri-level inputs.

NIC Functions: The NIC (Network Interface Controller) functions include the network connection as well as a computing element that is the heart of the Broadlinx hardware. This controller communicates with the internal micro-controllers within the Trinix chassis as well as with the outside world via the network connection. The NIC is a 10/100 connection that will communicate via HTTP and (optionally) SNMP protocols.

Output Monitor: The BL-33000 provides output monitoring for DV-33128 and DV-33256 systems. Two output monitor ports are included, each with an inverted and non-inverted output. (These output monitor ports are not available when the NR-33000 is installed in a DV-33512 chassis. DV-33512 monitoring is provided by the SR-33500 board, described below.)

Adding a second BL-33000 provides two extra sync inputs,[1] two extra output monitor ports, and redundant Broadlinx functionality.

TRX-CTRL-CPL

Trinix Info Command: CPL Control

TRX-CTRL-XPT

Trinix Info Command: XPTControl

NR-33000

See BL-33000 Broadlinx option.

TRX-SR-33500

Sync Reference / Output Monitor (OPM) Board. This board is used in DV-33512 units only.

Sync functions: The SR-33500 includes four looping sync-reference 75 ohm BNC inputs which can be NTSC, PAL or Tri-level inputs.

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1. Although a DV-33512 chassis may include SR-33000 and NR-33000 boards (each with two sync inputs), and an SR-33500 board (with four sync inputs), the maximum number of usable sync inputs for any Trinix chassis remains four.

Output monitor: Four output monitor ports are included, each with an inverted and non-inverted output.

Broadlinx capability can be added by installing an BL-33000 Broadlinx option in the associated power supply chassis.[1]

Port Expanders

As described above (page 43), these passive, bi-directional modules provide dual and quad outputs as needed for signal duplication and system expansion.

TRX-PE- 33016

The PE-33016 Port Expander has 32 connectors on one side and 32 on the other. Sometimes referred to a "2 x 2 module," the PE-33016 can be used as a 2 to 1 combiner (with dual outputs) or a 1 to 2 splitter. One or many of these can be installed as the need requires. Using this as a splitter provides dual outputs (non-inverting) for 16 outputs at a time. Installs in MK-33000 Mounting Kit. Since no application uses more than 48 connectors, each PE-33016 is supplied with 16 BNC 75 ohm terminators. Additional connectors, if needed, must be provided by the end-user.

TRX-PE-33008

The PE-33008 is a 4 x 1 expander module that has eight BNC connectors on one side and 32 on the other. This unit can be used as a 4 to 1 combiner or a 1 to 4 splitter. One or many of these can be installed as the need requires. Using this as an output splitter makes quad outputs for eight outputs at a time. Installs in MK-3000 Mounting Kit. All unused connectors must be terminated with 75 ohm BNC terminators (not supplied by Grass Valley).

TRX-MK-33000

The MK-33000 Mounting Kit, which accommodates up to 16 port expander modules, is eight rack units high and approximately 4 inches deep.

TRX-LD-33100

Loader module. These boards are available for use in systems that have been pre-wired for later expansion. They provide correct termination for installed but unused cables that connect to an "active" Port Expander module. For more information, see page 56.

SNMP/NetCentral Software Options

Order one license key per frame being monitored via SNMP/NetCentral. Note: For an overview of NetCentral and associated applications, see page 22.

TRX-NETCEN-128

NetCentral SNMP Agent License Key for Trinix 128 x 128 frame

TRX-NETCEN-256

NetCentral SNMP Agent License Key for Trinix 256 x 256 frame

TRX-NETCEN-512

NetCentral SNMP Agent License Key for Trinix 512 x 512 frame

Miscellaneous

MNC-XPT-CBL-3

Crosspoint Bus Cable, 3 ft. (0.91 m)

MNC-XPT-CBL-10

Crosspoint Bus Cable, 10 ft. (3 m)

MNC-XPT-CBL-25

Crosspoint Bus Cable, 25 ft. (7.6 m)

MNC-XPT-CBL-50

Crosspoint Bus Cable, 50 ft. (15.2 m)

Crosspoint Bus Terminator

Included with all systems. Part number: 01-053050-001.

CB-3000B

Crosspoint Bus Buffer. Provides eight additional crosspoint bus outputs. 1 RU. 110/220 VAC. A CB-3000 is required in the following cases:

- DV-33128 systems with eight or more chassis
- DV-33256 systems with four or more chassis
- DV-33512 systems with two or more chassis

MNC-CBLBNC-02

BNC to BNC Cable, 2 meters

TRX-HD128-KIT

Trinix 128HD Spares Kit. Includes 1 ea. BL-33000, DM-33100, FM-33000, HI-33200, HO-33120, and PS-33100

TRX-HD256-KIT

Trinix 256HD Spares Kit. Includes 1 ea. BL-33000, DM-33100, FM-33000, HI-33200, HO-33120, and PS-33200

TRX-HD512-KIT

Trinix 512HD Spares Kit. Includes 1 ea. BL-33000, DM-33512, FM-33000, HI-33200, HO-33120, and PS-33200

TRX-MAN

Trinix Planning and Installation Manual

Section 3

Installation

Summary of Installation Procedure

The following is a summary of the steps needed for installation of the Trinix Routing Switcher System. Additional details may be found elsewhere in this manual as indicated.

1. Before unpacking the equipment, inspect the shipping carton for evidence of freight damage. After unpacking carefully inspect all equipment for freight damage.

   If the contents have been damaged, notify the carrier and Grass Valley (see page 4 for contact information). Retain all shipping cartons and padding material for inspection by the carrier.

   Do not return damaged merchandise to Grass Valley until an appropriate claim has been filed with the carrier and a material return authorization number has been received from Grass Valley.

2. If the switcher is received without a rack, it should be mounted in a 19-inch wide frame or other suitable enclosure that provides power and cooling facilities for the equipment.

   a. It may be necessary to install special rack spacers so that the router's access door can be opened far enough to permit removal of components on the right side of the chassis (such as power supply modules). The spacers, which are available on request, should only be installed when the rack's mounting holes are recessed more than 0.6 inch (15.2 mm) from the front surface of the rack. For more information, see page 96.

   b. Some switchers are supplied with PE-33016 Port Expanders, which depending on the configuration can be used to provide dual outputs, quad outputs, input expansion, output expansion, and multi-chassis output monitoring. For illustrations of port expander applications, see page 43.

   c. Power requirements are shown on page 79.

   d. Environmental limits are shown on page 80.

3. Power supplies are factory-installed and auto-sensing. No field adjustment should be necessary.

Power supplies for 512 x 512 (DV-33512) switchers are mounted in a separate chassis and require cabling (supplied) from the “DC Output” connector of the power supply chassis to the “DC Input” connector of the switcher chassis. The 512 power supply chassis may be mounted above or below the main chassis, depending on video cable routing requirements (or weight distribution requirements).

For additional power supply information, see page 104.

4. For 512 x 512 (DV-33512) switchers:

CAUTION In order to avoid damaging the switcher, power must be Off before installing the “IFC” cables as described in the following step.

a. Install the “IFC” cables (supplied) between (1) the power supply chassis and main chassis, and (2) between the main chassis center section and the fan module section.

For an illustration, see page 102.

5. If the system is supplied with PE-33016 Port Expanders, check the input/output expansion DIP switches and jumpers for correct position.

These switches and jumpers are normally set at the factory based on the configuration shown in the sales order. For more information, see page 124.

6. On High Definition switchers:

a. Signal reclocking mode can be set for each output on an output board. The factory default setting is “Auto,” meaning that properly-formed, standard data rate signals will be reclocked but other signals will be bypassed (not reclocked). See page 134 for details.

SD switchers do not include reclocking.

7. Make sure all cards are all seated in their backplane sockets.

This should not normally be an issue since the boards are held in place with locking extractors.

8. Connect the desired input and output video cables.

   To permit proper vertical interval switching, the inputs must be aligned within plus/minus 1/4 line with respect to the reference signal.

   The use of 75 ohm BNC connectors (rather than 50 ohm) is recommended for HDTV applications.

   If the system includes port expanders, all unused BNC connectors must be terminated with 75 ohm terminators.

   On DV-33512 units, the output connectors are not arranged in a left-to-right sequence. The rear-panel labels are correct.

Note Labels for "0-based" numbering schemes are available. See page 40.

9. For "protected path" operation, the Broadlinx software can be configured to monitor router outputs that are feeding critical downstream equipment (such as a transmitter). If the "primary" output signal is interrupted, the system will automatically select the "secondary" output that is carrying the same signal and trigger a system alarm. For wiring information, see page 60. For configuration instructions, see *Section 5-Protected Path Configuration.*

10. If the router is equipped with VI-33100 "universal" input boards, and analog signals are received, an extensive set of gain, phase, filtering, and other adjustments are available for each signal. For more information about the VI-33100 module, please refer to *Section 6-Analog Input Processing.*

11. Connect the appropriate house reference signal(s).

    Depending on the system, up to four independent sync references can be used. For system diagrams, see page 107.

12. Re-configure the switch point if desired.

    The switch point is factory-set to the recommended video line for the standard that is detected. A V-phasing feature, available with the NR-33000, SR-33000 with Rev B FPGA Software Update, and SR-33500 allows the user to adjust the switch point from -1 line to +2.5 lines if necessary. For more information, see page 117.

Note If you make adjustments on the SR-33500 as part of this step, you may want to wait until all remaining steps in this list have been followed and any additional adjustments made before reinstalling the board.

13. Select the desired sync line on each Output board.

    This applies to systems with more that one sync reference. Each output board provides a block of 32 outputs and by factory default each block is assigned to sync line 1, which corresponds to the "Primary Ref IN 1″ connector on the rear panel. If additional references are used, DIP switches are set to assign each board to one of four possible sync lines. See page 123.

14. If output monitoring is required, refer to the installation instructions starting on page 137.

15. On multi-chassis systems, the Frame number switches should be checked. See page 146.

16. Connect the switcher to the control system:

— For Jupiter control system connections and settings, see page 148.

— For SMS 7000 or Encore control system connections and settings, see page 153.

17. LAN and Com Bus connections and configuration of the **Broadlinx** board (NR-33000 NIC/Sync/OPM board) are covered in the above discussions about control systems.

The Broadlinx board is equipped with a plug-in, rechargeable lithium-ion battery used to back up switcher status for Encore-controlled systems. The battery is rated for approximately 500 power cycles. If there is a power failure, and the battery fails to provide power, the Broadlinx board will need to obtain router status from the Encore System Control Module (data will be sent automatically). For the location of this battery, see page 119.

18. (Optional) Connect the rear panel ALARM BNC to the facility alarm system. The alarm port operates according to SMPTE standard 269M-1999.

For an overview of the alarm system, see page 42.

The rear panel Alarm BNC can be configured to report primary alarms only or both primary and secondary alarms. The factory default setting is to report both. DV-33128/33256 configuration is via a jumper on the NR/SR-33000 board, as shown on page 119 and page 120. DV-33512 configuration is via a jumper on the RP-33500 512 x 512 Rear Panel board as shown on page 122.

19. Power up the system by connecting the AC power cords. If the LED on the front panel turns to green after the first few seconds of operation, the system is operating properly. If the LED continues to glow red, remove power and diagnose the problem before powering up the system again. For an explanation of LED alarm lights, see page 211.

CAUTION For DV-33512 switchers: In order to avoid damage, power must be Off before removing/installing the “IFC” cables.

20. Keep the front door closed as much as possible when the system is running.

Note   The front door should be closed during normal operation. Although the Trinix switcher will function properly with the door open, leaving the chassis open on a consistent basis will result in shortened product life.

Figure 39. Installation of rack spacers (when needed).

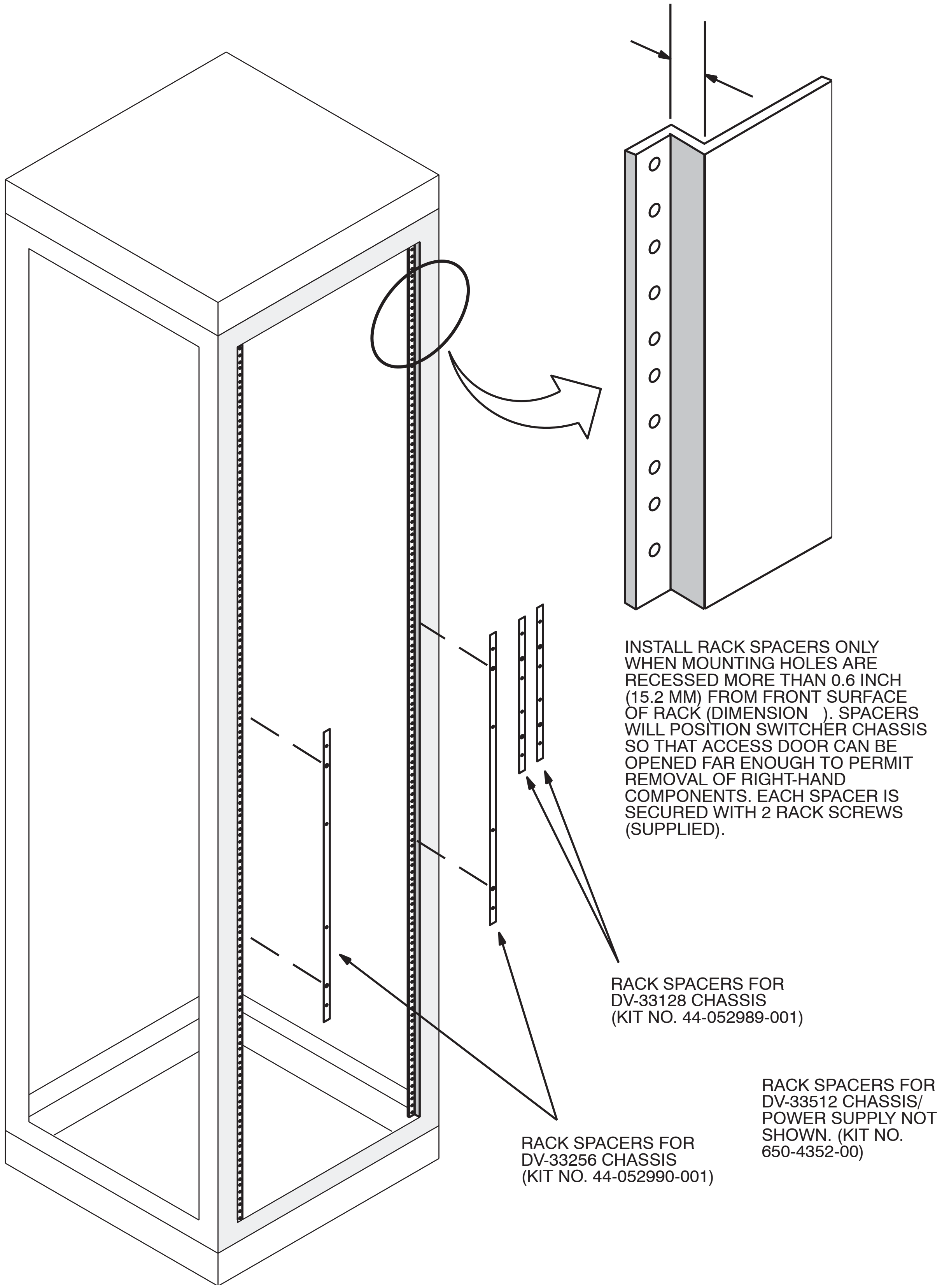


Figure 40. DV-33128 front view (door removed).

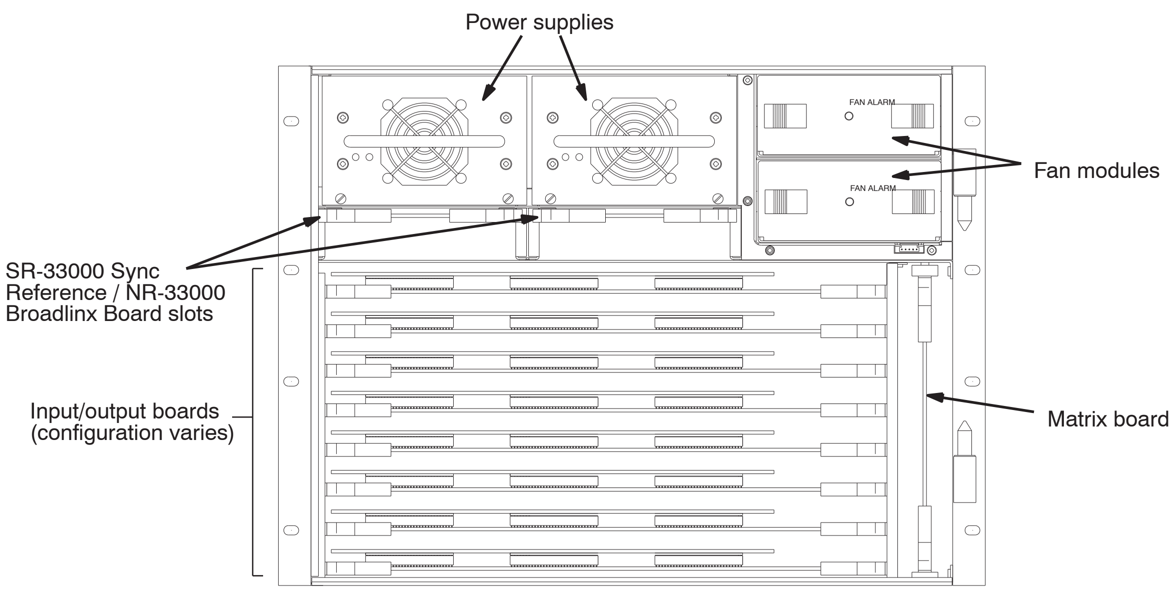


Figure 41. DV-33128 rear panel

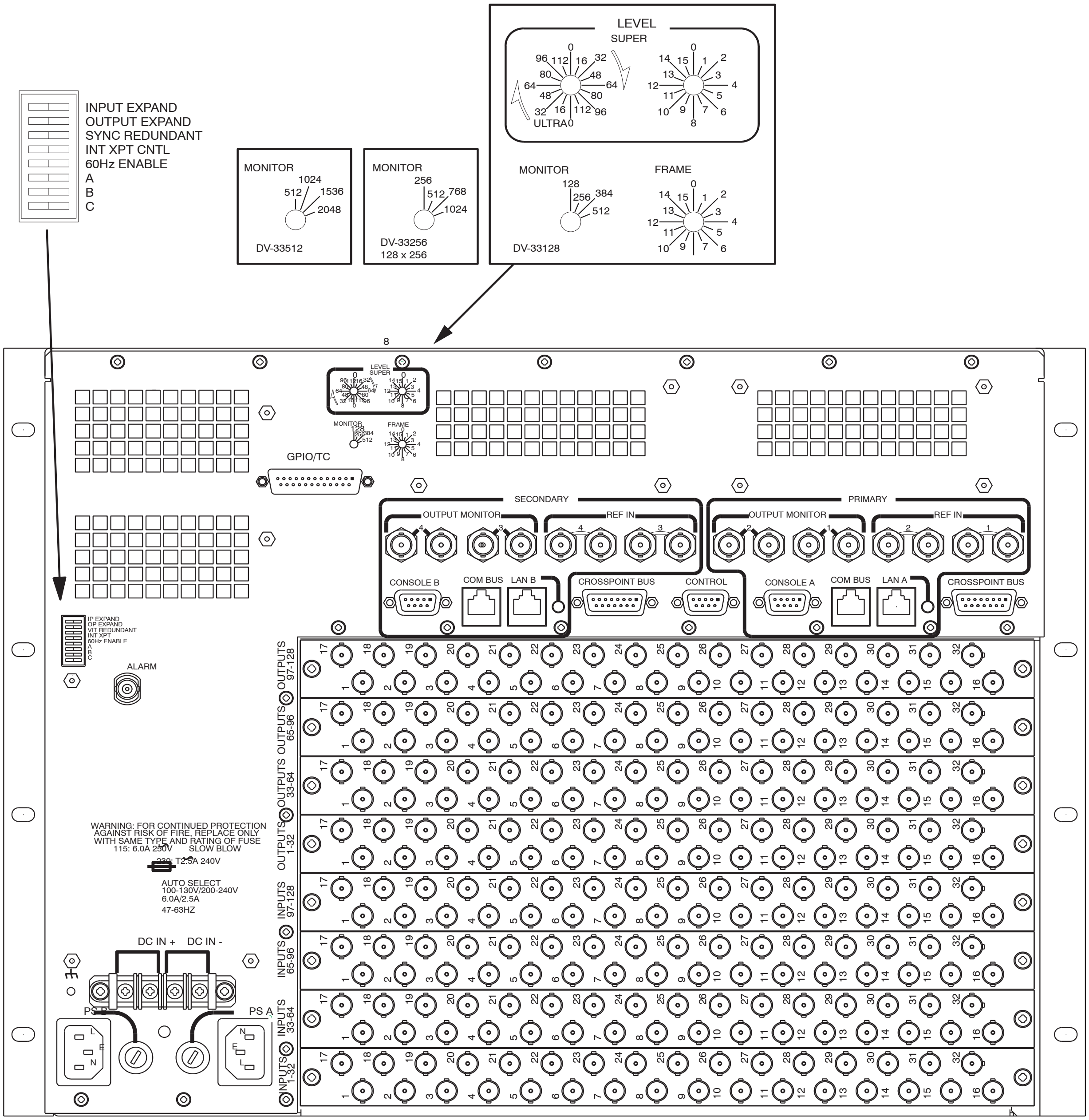


Figure 42.

Figure 43. DV-33256 front view (door removed).

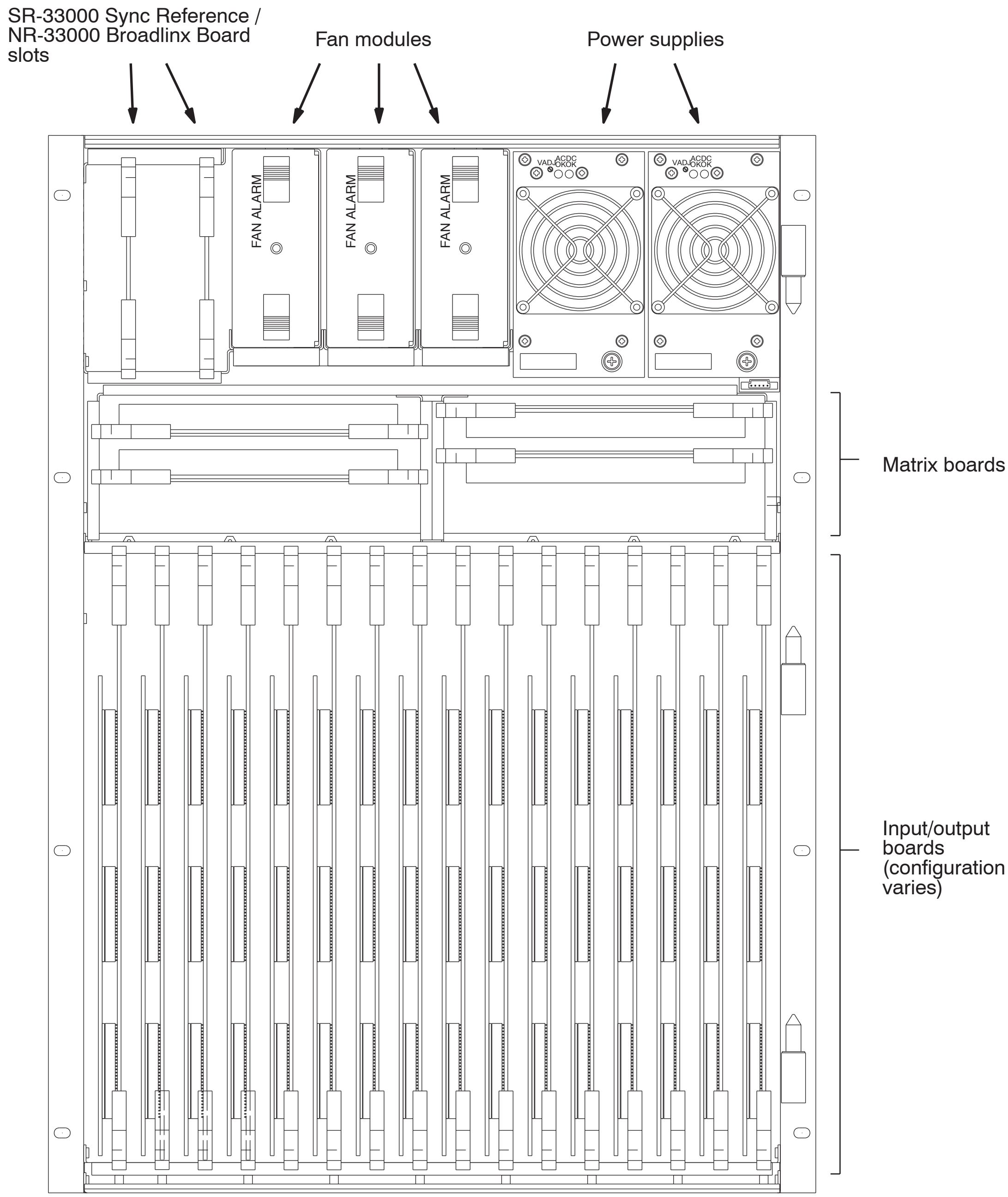


Figure 44. DV-33256 rear panel

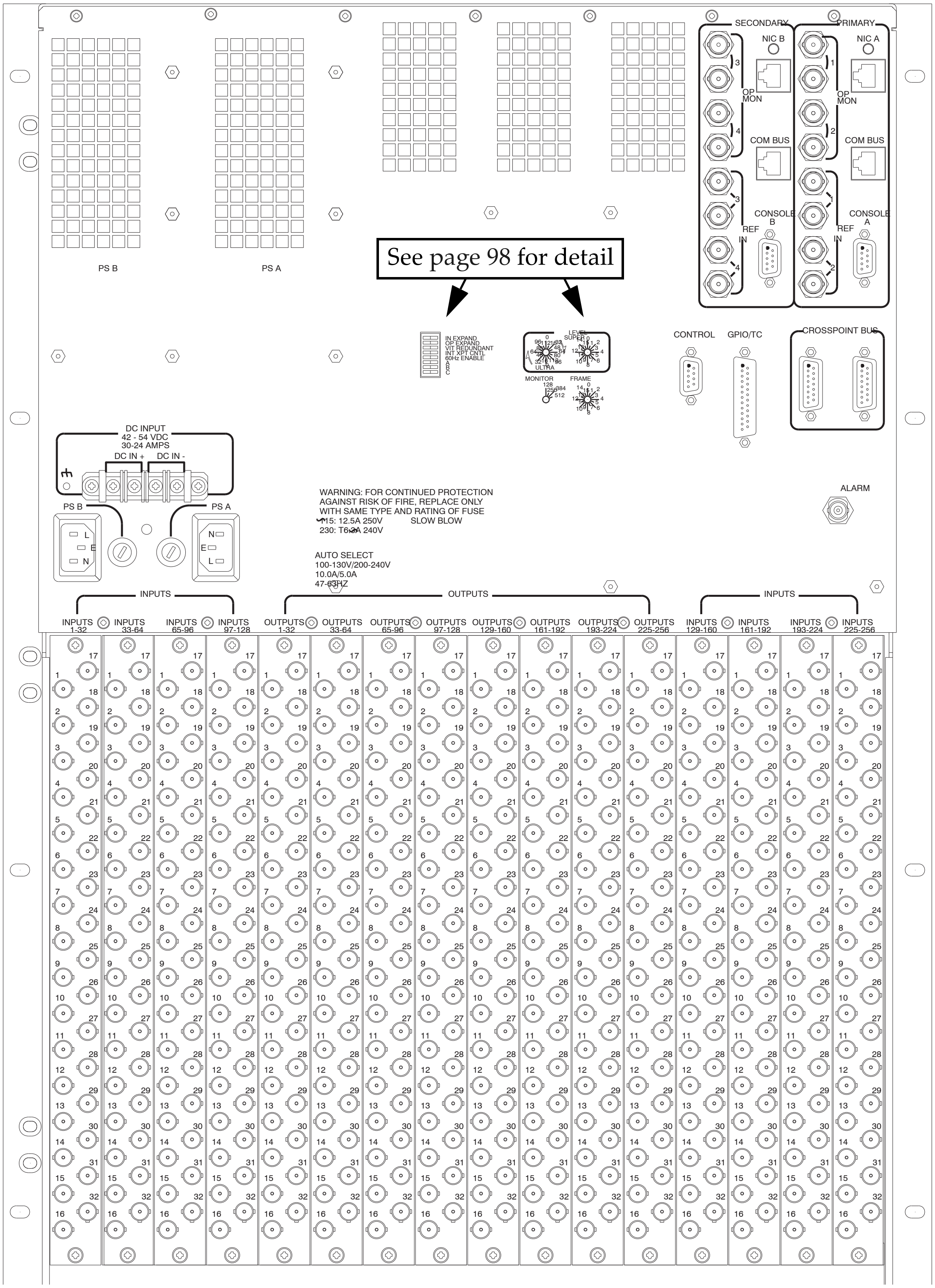


Figure 45. DV-33512 main chassis and associated power supply unit

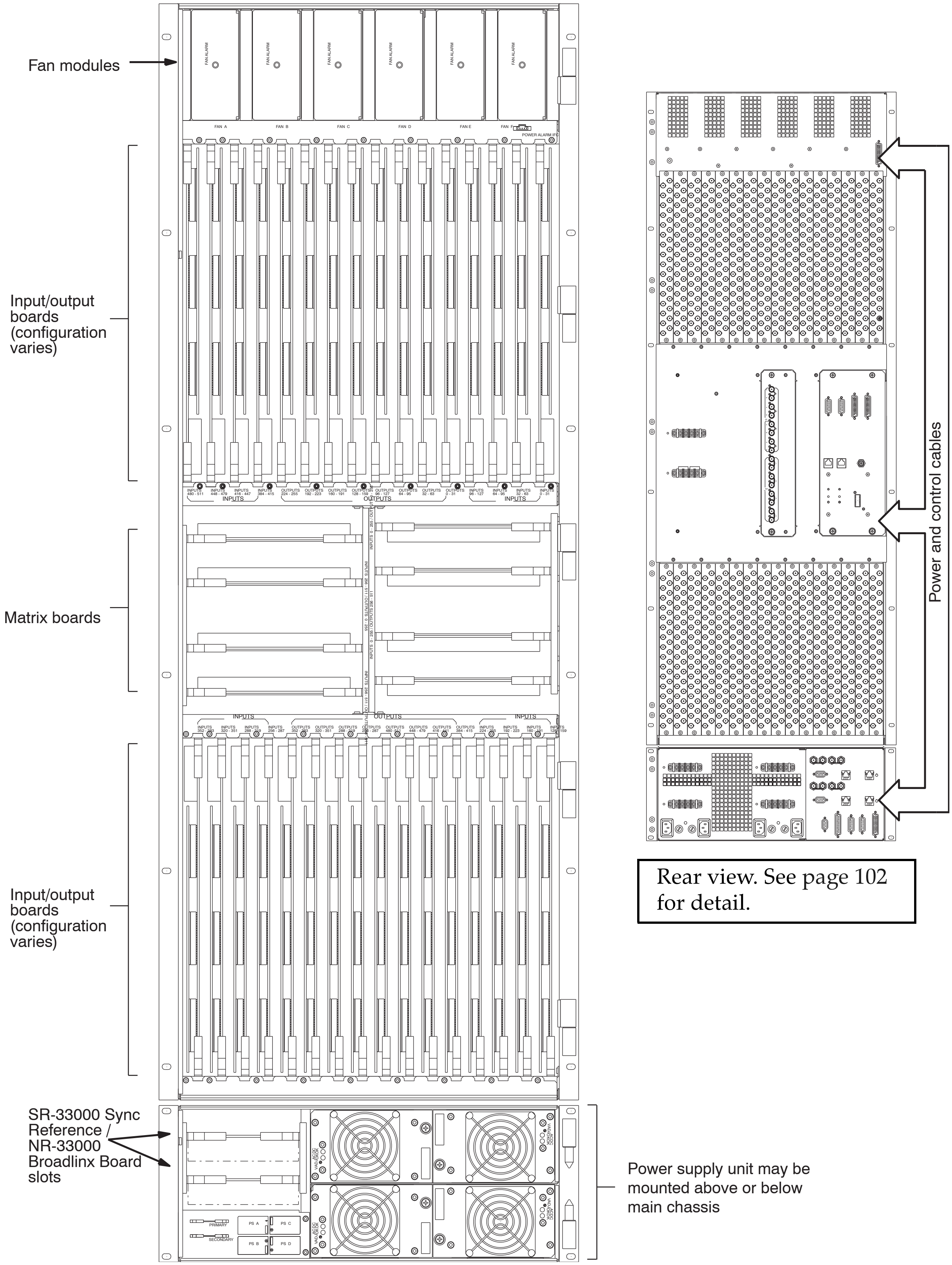
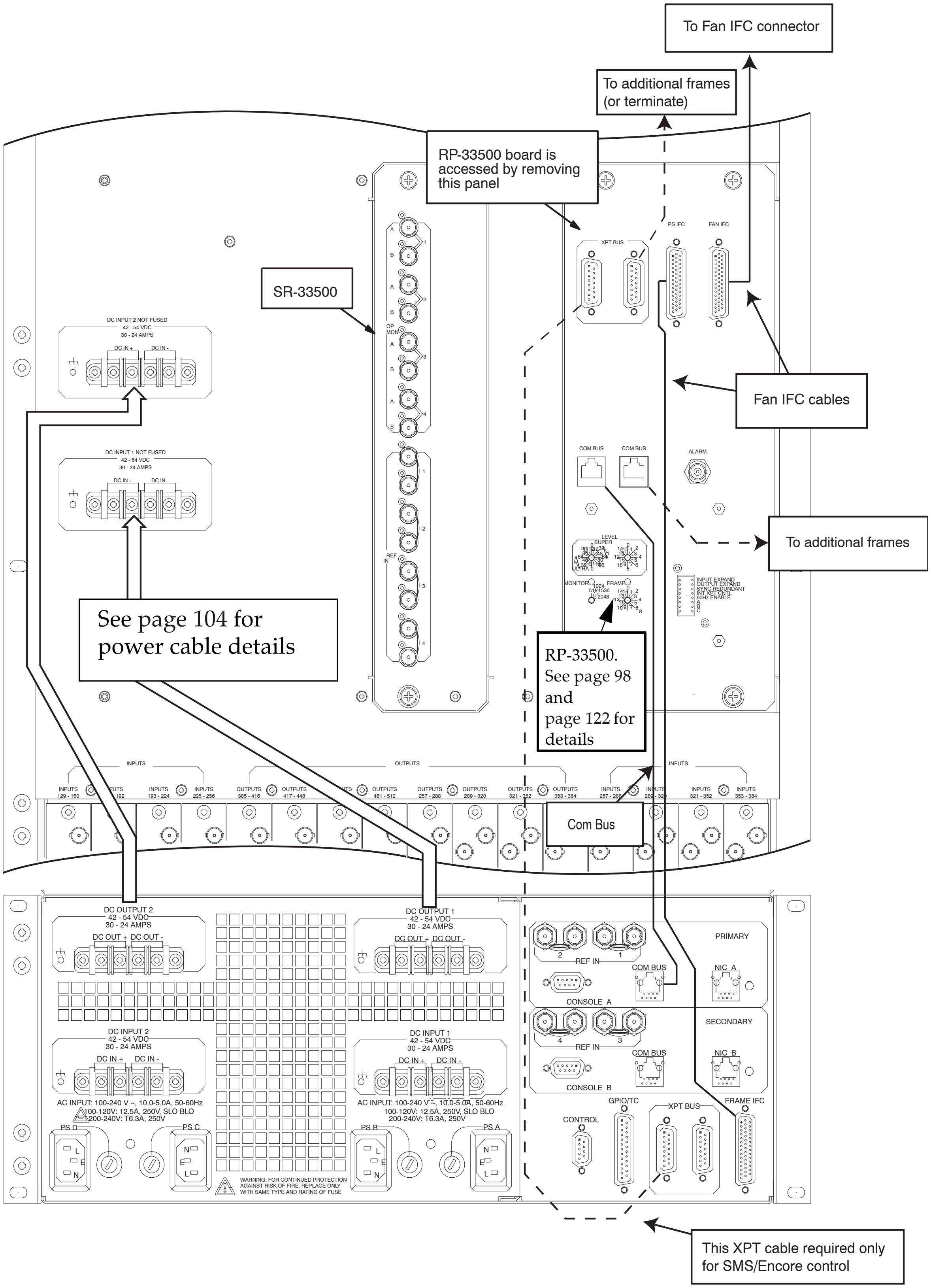
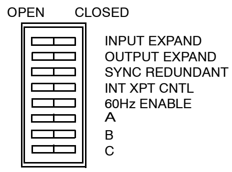


Figure 46. DV-33512 main chassis and power supply chassis connections.



Rear Panel Dip Switch Settings



Input/Output Expand

See page 124.

Sync Redundant

Note   This switch may be labelled “VIT Redundant” on some units.

If the system is equipped with a secondary NR-33000 board, closing this switch will provide continued operation in case of a single NR failure. However, operating in the redundant mode will limit the number of possible sync sources to two. In DV-33512 systems, if Sync Redundant mode is selected the “C” switch must also be closed. For more information, see page 111 and page 115.

Internal Xpt (Crosspoint) Control

Open = Trinix crosspoint bus is controlled by an external crosspoint bus controller (e.g., a Jupiter VM-3000 or CM-4000; or, an NR board in another frame).

Closed = Trinix crosspoint bus is controlled by an internal crosspoint controller (i.e., an NR-33000 Sync/NIC/OPM board). This setting is used when the NR is in turn being controlled through a LAN connection to a control system such as a Grass Valley Series 7000 Signal Management System or Encore.

For more information, see page 148 and page 153

60 Hz Enable Switch

This switch is reserved for future use.

A B C Switches

The “A” switch is reserved for future use.

The “B” switch is closed in output-monitor-expanded systems where output monitor signals are brought through a combiner. See page 144.

The “C” switch must be closed in DV-33512 systems whenever the Sync Redundant switch is closed. This will prevent use of any sync reference connected to the SR-33500 Sync/OPM board.

Miscellaneous rear panel connectors

GPIO/TC - General Purpose / Time Code connector

This connector is reserved for future use.

Console A & B connectors

These connectors are for factory use.

Control Connector

This connector is reserved for future use.

Power Supply Notes

Power supply specifications are shown on page 79.

Ventilation is critical for Trinix power supplies, which should not be run with the fan not working. (If the supply begins to overheat it will shut itself off automatically to prevent damage.) The use of redundant power supplies is highly recommended.

DV-33128 and DV-33256 Chassis Installations

AC Applications

Power supplies are factory-installed and designed to be hot-swappable.

Note Fuses must be selected and installed as appropriate for mains voltage.

For systems with only one power supply, SR/NR-33000 sync card(s) jumper JN2 must be set to "DC," otherwise the red "PALARM" LED on the front edge of the SR/NR(s) will remain on. If a redundant power supply is installed at a later time, JN2 must be moved to "AC." See page 120.

DC Applications

Connect the DC Input connector to a DC source.

Note **For DC applications fusing *must* be provided externally, in accordance with local electrical regulations.** DC input specifications and characteristics for the Trinix are shown on page 80.

Check to see that the SR/NR-33000 sync card(s) have jumper JN2 set to "DC." See page 120.

Simultaneous AC and DC Applications

It is possible to connect both AC and DC power sources as part of a system redundancy scheme. In this case, refer to the AC and DC notes above. SR/NR-33000 jumper JN2 should be set to "AC."

DV-33512 Chassis Installation

AC applications

Power supply modules for 512 x 512 switchers are mounted in a separate chassis and require cabling (supplied) from the “DC Output 1" connector of the power supply chassis to the “DC Input 1" connector of the switcher chassis; and from “DC Output 2" to “DC Input 2."

CAUTION Do not cross these cables. Output 1 *must* go to Input 1 and Output 2 to Input 2 in order for the alarm system to operate properly.

Pinouts are shown on page 106. An illustration of the power connectors is shown on page 102.

The power supply modules are factory-installed and designed to be hot-swappable.

Note Fuses must be selected and installed as appropriate for mains voltage.

For systems with only one power supply, RP-33500 512 x 512 Rear Panel card jumper JN1 must be set to “DC,” otherwise the Alarm LED on the chassis front panel will remain on. If a redundant power supply is installed at a later time, JN1 must be moved to “AC.” See page 122.

DC Applications

In DC applications, the DV-33512 may or may not include a separate power supply chassis.

When a separate power supply chassis is used:

1. Connect the DC source to the DC Input 1 and DC Input 2 connectors of the PS chassis.
2. Use the supplied cables to connect the DC Output 1 and 2 connectors of the PS chassis to the DC Input 1 and DC Input 2 connectors of the main chassis. Pinouts are shown on page 106.

CAUTION Do not cross these cables. Output 1 *must* go to Input 1 and Output 2 to Input 2 in order for the alarm system to operate properly.

When there is no PS chassis, connect the DC source directly to the DC Input 1 and DC Input 2 connectors of the main chassis.

Note **For DC applications fusing *must* be provided externally, in accordance with local electrical regulations.** DC input specifications and characteristics for the Trinix are shown on page 80.

An illustration of the power connectors is shown on page 102.

Check to see that the RP-33500 512 x 512 Rear Panel card has jumper JN1 set to “DC.” See page 122.

Simultaneous AC and DC Applications

It is possible to connect both AC and DC power sources as part of a system redundancy scheme. In this case, refer to the AC and DC notes above. RP-33500 jumper JN1 should be set to "AC."

Table 16. DV-33512 DC power cord pinouts.

Power supply connector	Cable description	Main chassis connector
⏚ (Ground)	Yellow/green	⏚ (Ground)
	Plain black	
DC Out + (left)	1 (red)	DC In + (left)
DC Out + (right)	2 (blue)	DC In + (right)
DC Out - (left)	3 (white)	DC In - (left)
DC Out - (right)	4 (yellow)	DC In - (right)

Sync Reference Connections

For synchronous vertical interval switching the same sync reference signal must be sent to the control system and to the Trinix. (Trinix will operate without a sync connection but switching will be non-synchronous.) For SMS 7000 and Encore systems, sync must be connected to the Sync 1 input.

Note Some DV-33512 power supply units are not labelled correctly. See drawing on page 102 for correct REF IN connector labelling.

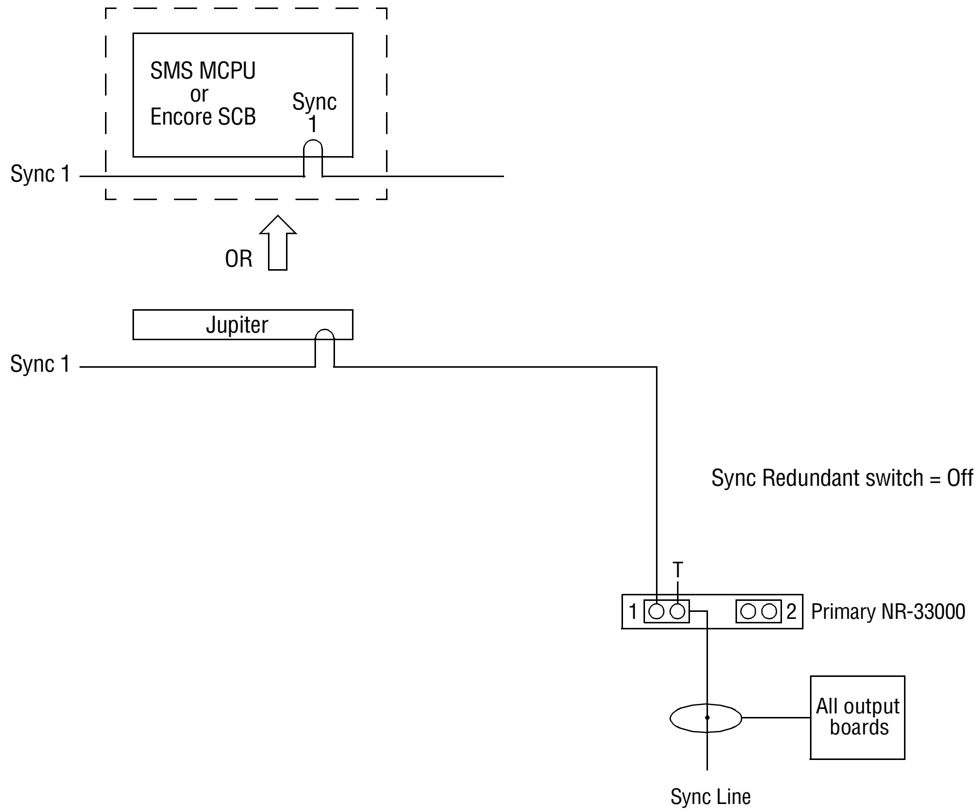
The SR-33000 Sync Reference / OPM board, the NR-33000 NIC/Sync/ OPM board, or (in DV-33512 units) the SR-33500 Sync Reference board can be used to lock the system to reference sync. Video standard (NTSC/PAL/HDTV) operation is auto-detected by the system. The sync signal can be video, black burst, 2 V composite sync, 4 V composite, or tri-level (HD). Each sync input uses looping 75 ohm BNC connectors; if a loop through is not used, the loop BNC should have a 75 ohm termination. For an illustration of the rear panel connectors, see page 98 (128 x 128); page 100 (256 x 256); or page 102 (512 x 512).

The sync source must also be selected on each output board (as described on page 123.)

The "Sync Redundant" switch mentioned in the following system drawings is on the rear panel of the chassis.

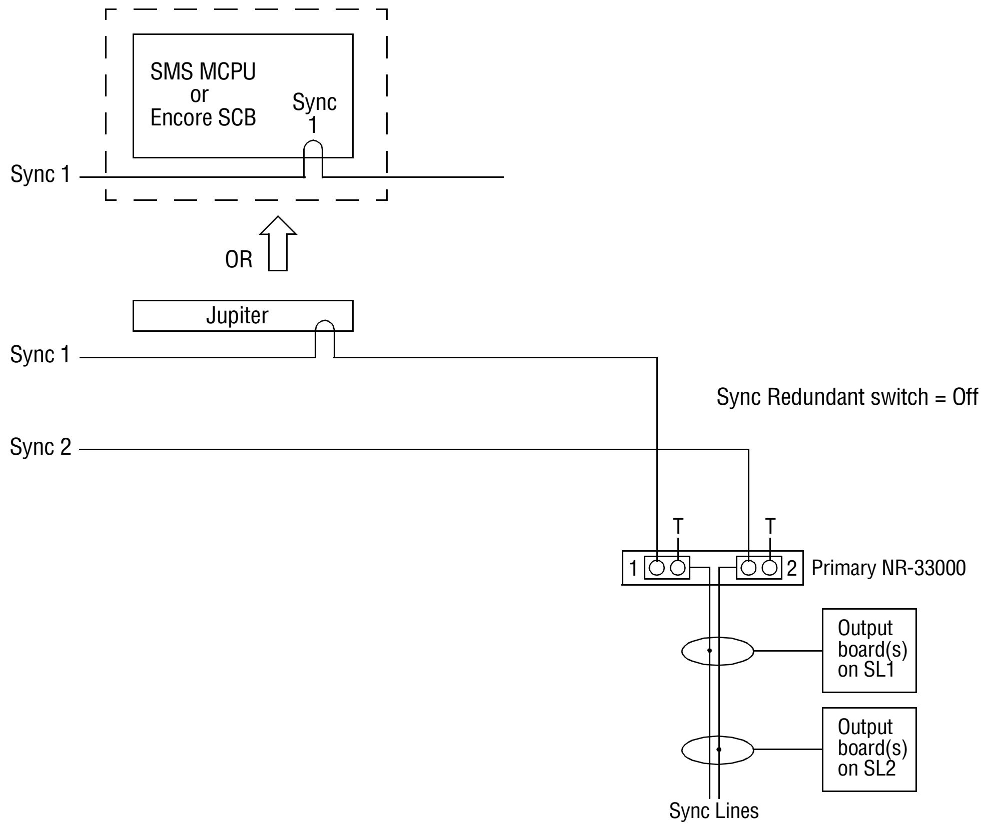
DV-33128 / DV-33256 with Single Sync Reference

Figure 47.



DV-33128 / DV-33256 with Dual Sync References

Figure 48.



Two independent sync signals can be connected to the Trinix. They may be different standards (e.g. SD and HD) or different phases of the same standard (e.g. NTSC and delayed NTSC). For example, SD sync could be used for one set of 32 outputs and HD sync for another set of 32 outputs.

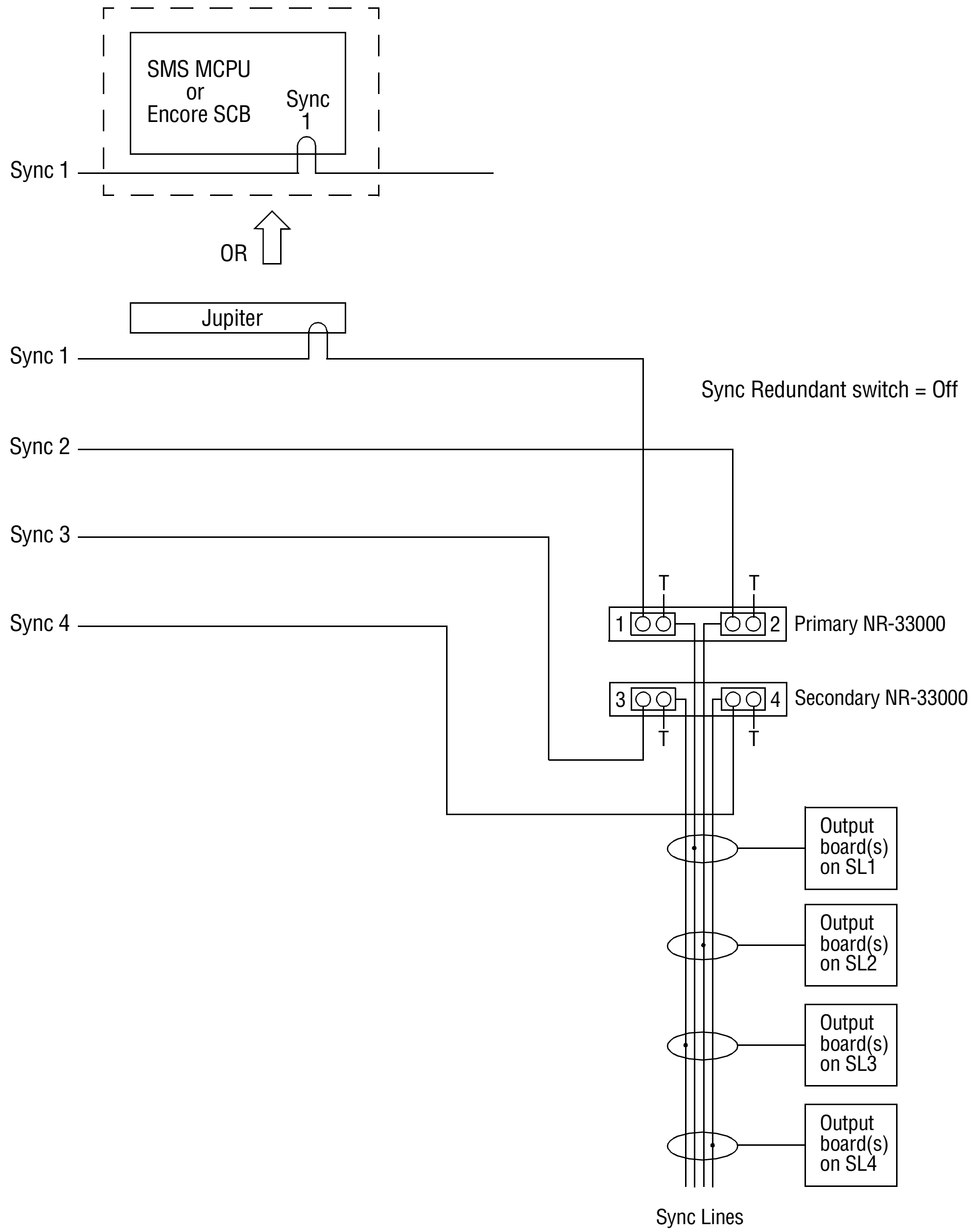
Sync Connection to Control System

Outputs using the same reference as the control system (Sync 1 in this example) will switch deterministically (i.e., perform frame-specific switching). Outputs using the other reference will switch synchronously and in the vertical interval but not deterministically. Which reference should be connected to the control system depends on the reference types involved:

- If SD and HD are used, SD is recommended for connection to the control system.
- If different phases of the same reference are used, the phase that is most delayed is recommended for connection to the control system.
- If NTSC and PAL are used, select the reference for those outputs where determinism is most important.

DV-33128 / DV-33256 with Multi Sync References

Figure 49.

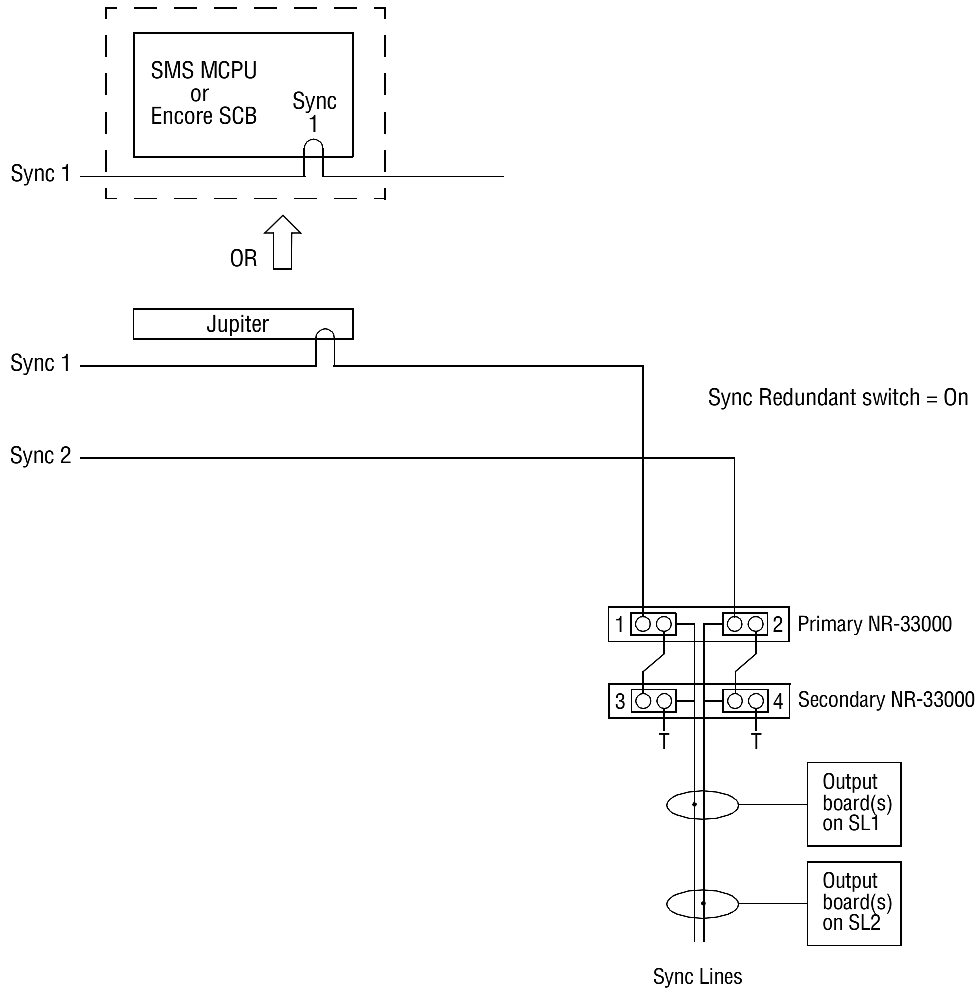


This arrangement is similar to that described on the previous page, except that all four possible sync references are used.

For a discussion concerning which sync reference should be connected to the control system, see *Sync Connection to Control System* on page 109.

DV-33128 / DV-33256 with Sync Redundant NR Operation

Figure 50.

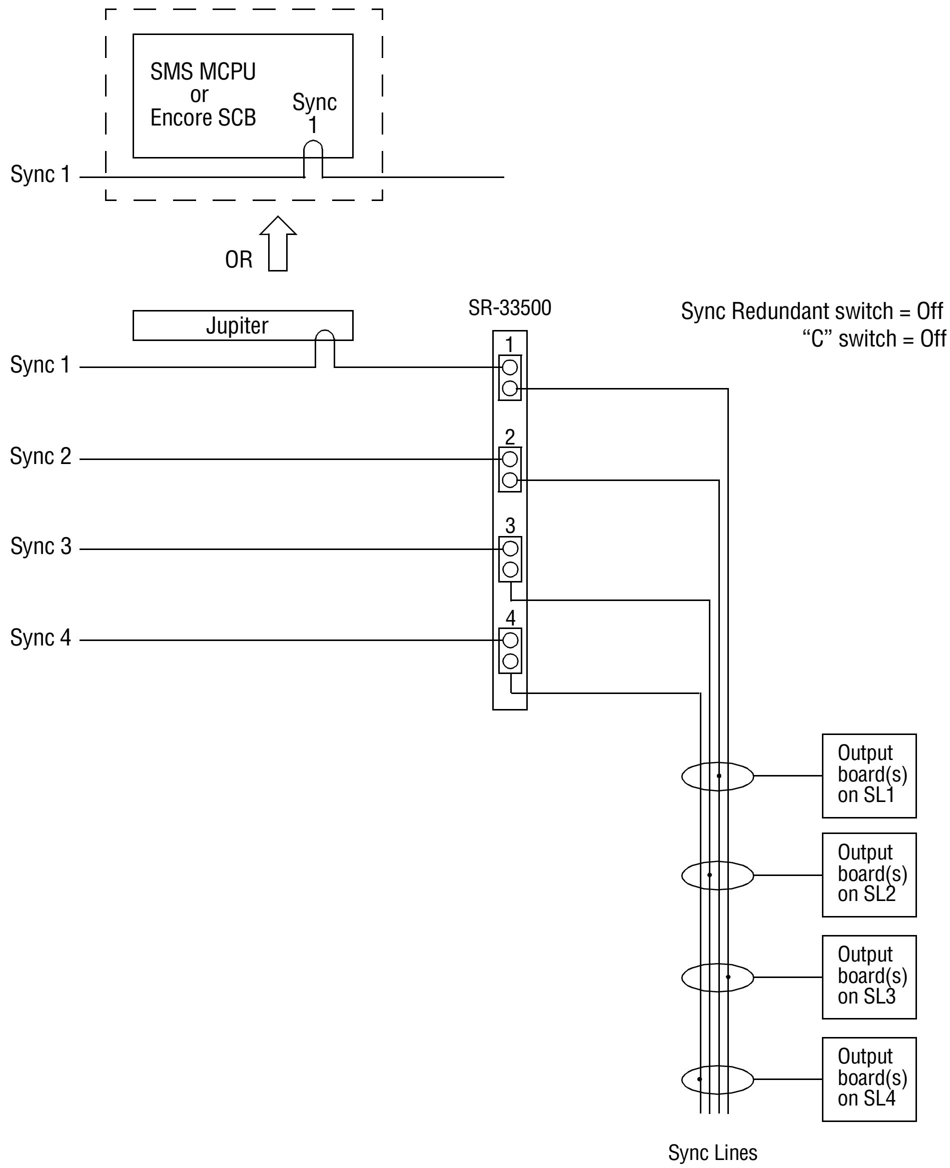


For NR-33000 redundant operation, one (or two maximum) sync references are looped from the Primary to the Secondary boards. If the Primary board fails the system will switch automatically to the Secondary board. Note that in this arrangement Sync Bus 1 is always combined with Sync Bus 3 and Bus 2 combined with Bus 4. When configuring the output boards, only “Bus 1” and “Bus 2” are valid selections.

For a discussion concerning which of the two sync references should be connected to the control system, see *Sync Connection to Control System* on page 109.

DV-33512 with Multi Sync References

Figure 51.



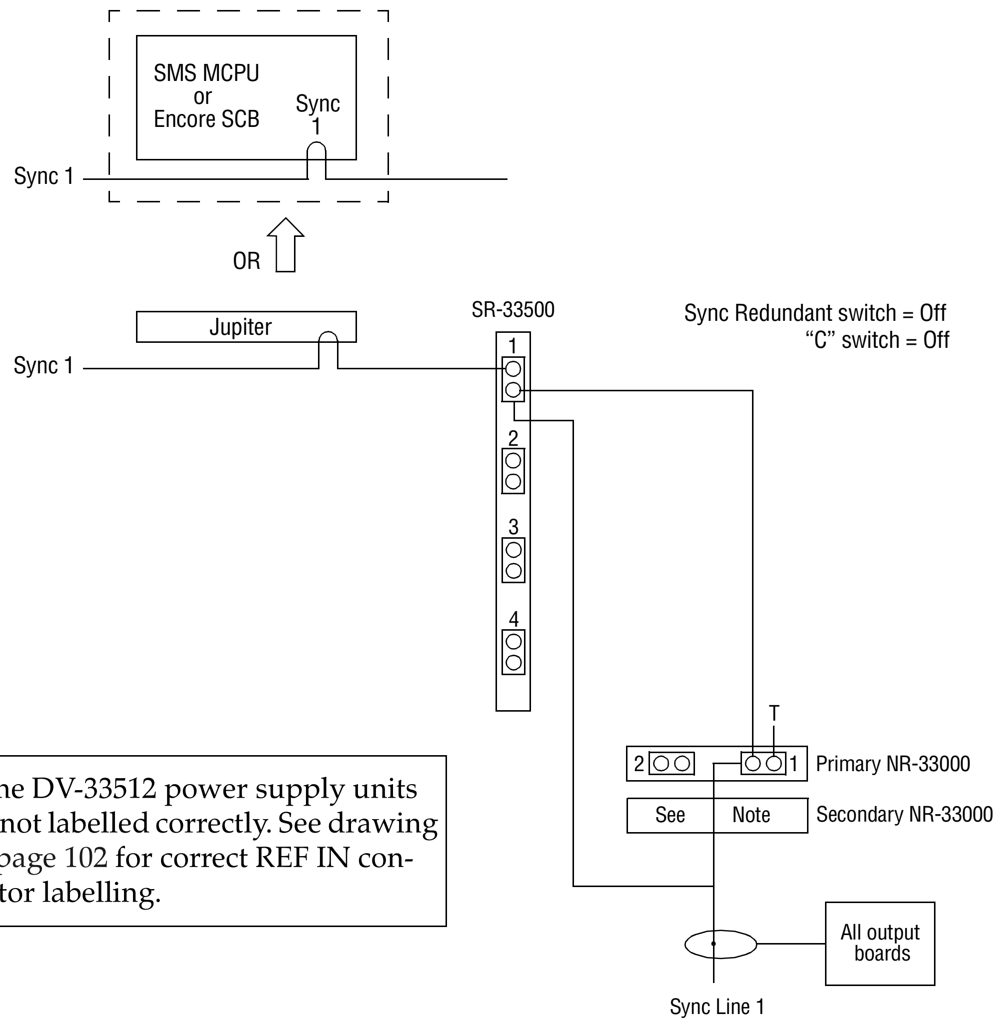
In DV-33512 units, which are normally supplied with an SR-33500 Sync/OPM board, up to four independent sync sources can be connected and any of the four can be selected for each output board.

For a discussion concerning which of the four sync references should be connected to the control system, see *Sync Connection to Control System* on page 109.

The "C" switch mentioned here and on the following drawings in on the Trinix rear panel.

DV-33512 with Single Sync Reference and Single/Dual NR-33000

Figure 52.



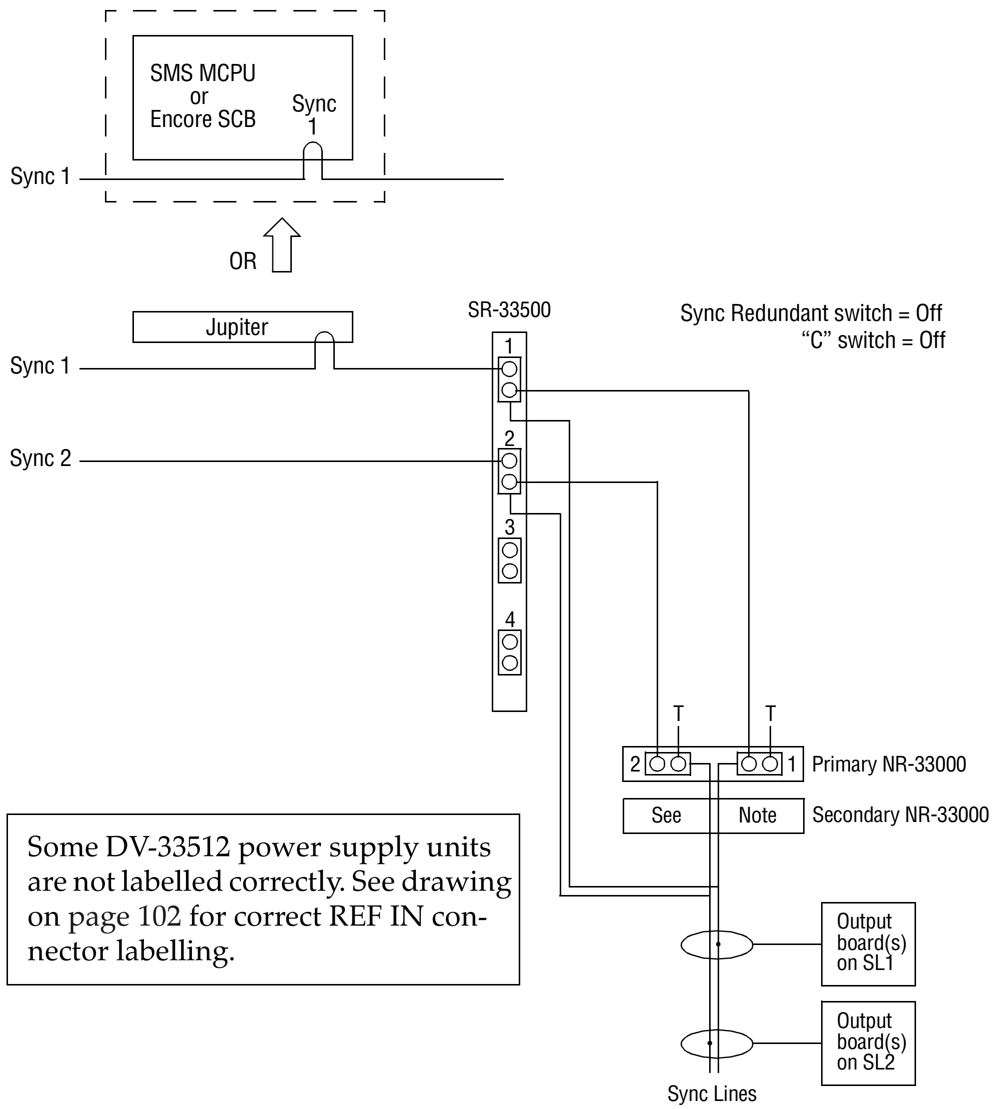
Some DV-33512 power supply units are not labelled correctly. See drawing on page 102 for correct REF IN connector labelling.

If desired, an NR-33000 board can be installed in the associated power supply chassis to provide Broadlinx capability. The board in the Primary slot will feed Sync Line 1. If the board is removed, Sync Line 1 will automatically switch to the SR-33500.

Note A secondary NR-33000 can installed to provide Broadlinx redundancy. In this case, the NR REF IN 3 and 4 connectors would not be used.

DV-33512 with Dual Sync References and Single/Dual NR-33000

Figure 53.



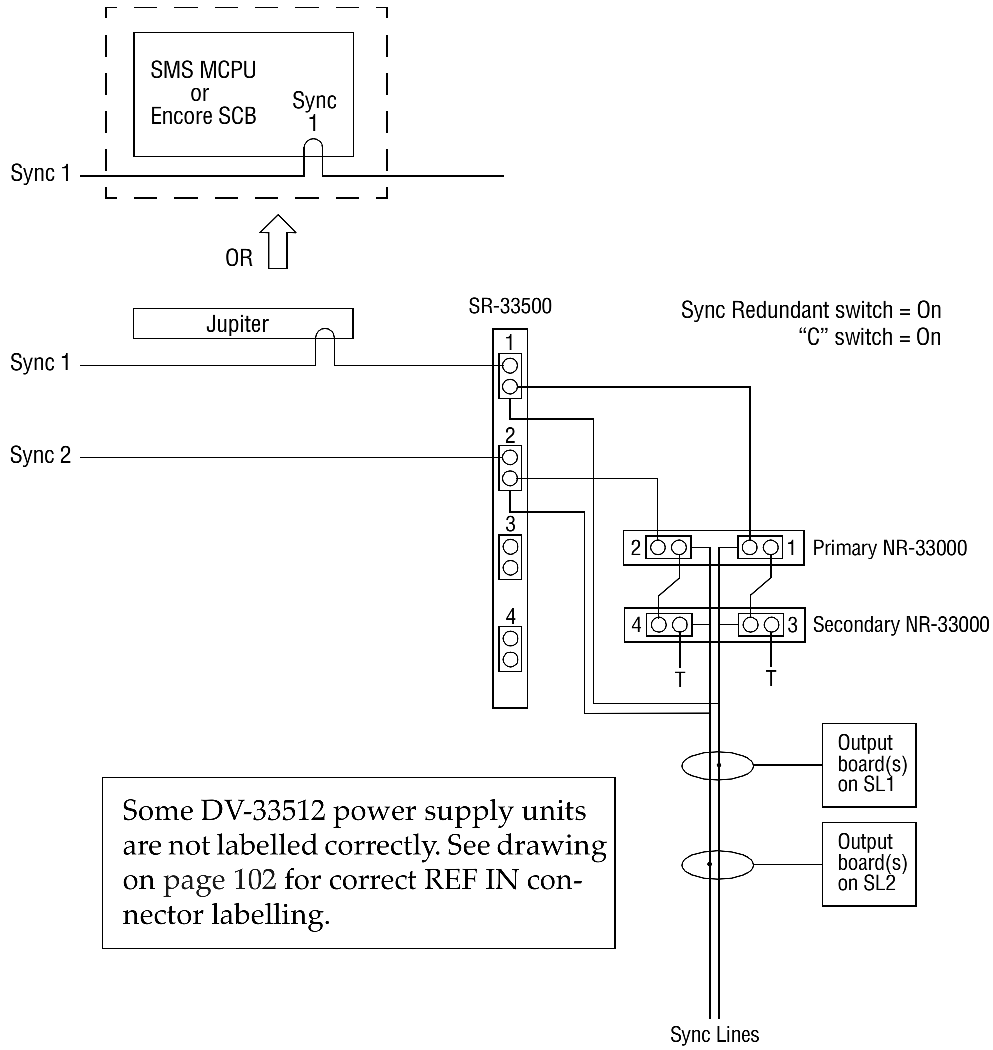
This arrangement is similar to that described on the previous page, except that two sync references are used. The NR board in the Primary slot will feed Sync Lines 1 and 2. If the NR is removed, Sync Lines 1 and 2 will automatically switch to the SR-33500.

Note A secondary NR-33000 can installed to provide Broadlinx redundancy. In this case, the NR REF IN 3 and 4 connectors would not be used.

For a discussion concerning which of the two sync references should be connected to the control system, see *Sync Connection to Control System* on page 109.

DV-33512 with Dual Sync References and Redundant NR Operation

Figure 54.



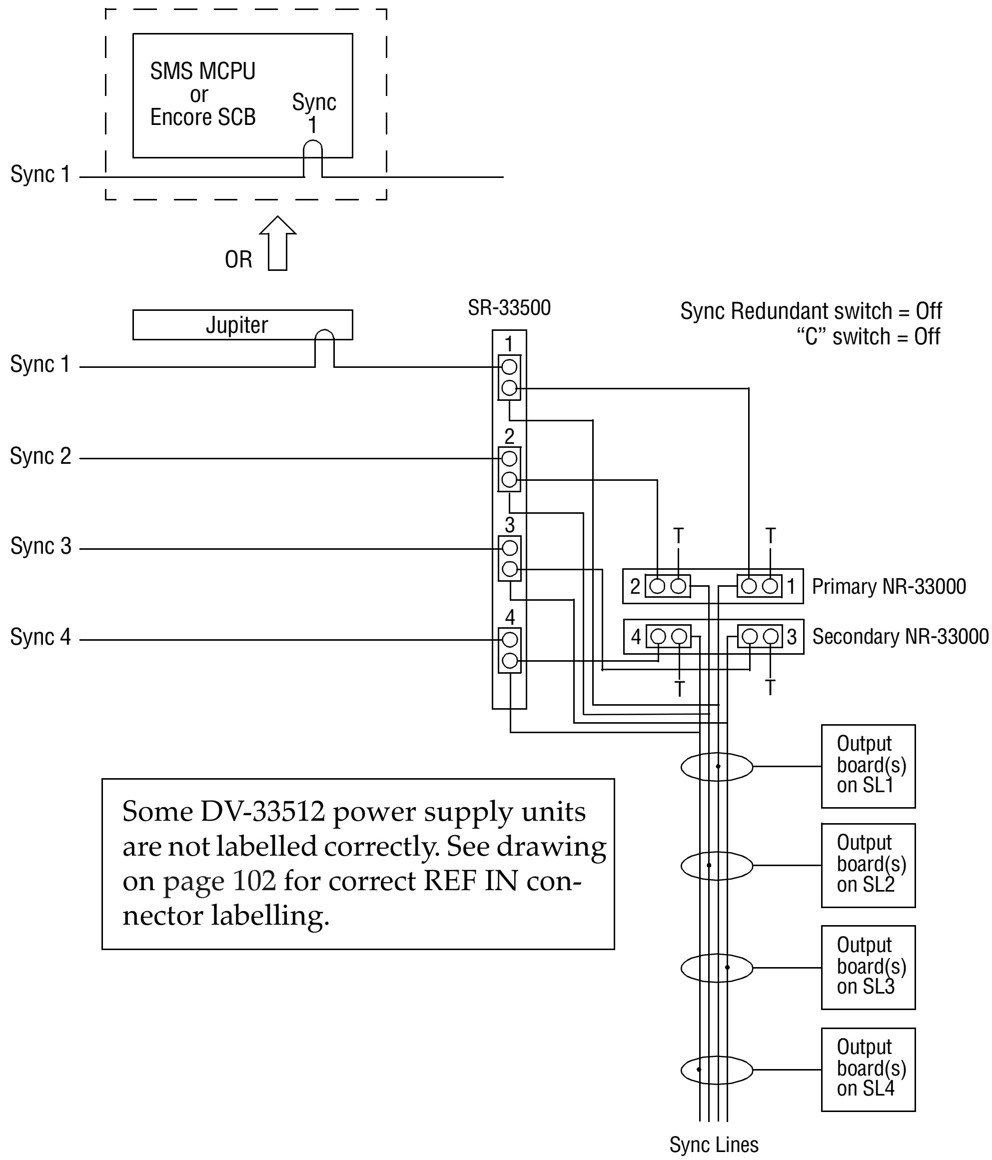
In this application, two sync references are looped through the SR-33500, the Primary NR board, and the Secondary NR board. The NRs are operated in redundant mode. If the Primary board fails the system will switch automatically to the Secondary board. If both NRs are removed, Sync Lines 1 and 2 will automatically switch to the SR board. Note that Sync Line 1 is always combined with Sync Line 3 and Line 2 combined with Line 4. When configuring the output boards, only "Bus 1" and "Bus 2" are valid selections.

Broadlinx operation is also redundant.

For a discussion concerning which of the two sync references should be connected to the control system, see *Sync Connection to Control System* on page 109.

DV-33512 with Multi Sync References and Dual NR-33000

Figure 55.



In this arrangement, all four possible sync references are used. Two NRs are installed, but **not** operated in sync redundant mode. The NR board in the Primary slot will feed Sync Lines 1 and 2; the NR board in the Secondary slot will feed Sync Lines 3 and 4. If the Primary NR is removed, Sync Lines 1 and 2 will automatically switch to the SR-33500. If the Secondary NR is removed, the SR will feed Sync Lines 3 and 4.

For a discussion concerning which of the four sync references should be connected to the control system, see *Sync Connection to Control System* on page 109.

NR/SR-33000 / SR-33500 V-Phasing

A V-phasing feature, available with the NR-33000, SR-33000 with Rev B FPGA Software Update, and SR-33500 allows the user to adjust the switch point from -1 line to +2.5 lines relative to the nominal switch point for the video standard being used. This is accomplished with NR-33000 DIP switch S3 (shown on page 119), SR-33000 DIP switch S2 (shown on page 120), or SR-33500 DIP switches S102/S103 (shown on page 121).

Table 17 shows the switches providing adjustment relative to Reference A ("Reference 1" on SR-33500). For SR-33000, "On" = switch closed.

Table 17. Switch point shift for signals referenced to Ref A / Ref 1

Switch point relative to Ref. A ("Ref 1" on SR-33500)	NR: S3-1 SR-33000: S2-1 SR-33500: S101-1	NR: S3-2 SR-33000: S2-2 SR-33500: S101-2	NR: S3-3 SR-33000: S2-3 SR-33500: S101-3
-1.0 line	On	On	On
-0.5 line	Off	On	On
Coincident **(default)**	On	Off	On
+0.5 line	Off	Off	On
+1.0 line	On	On	Off
+1.5 line	Off	On	Off
+2.0 line	On	Off	Off
+2.5 line	Off	Off	Off

Table 18 shows the switches providing adjustment relative to Reference B ("Reference 2" on SR-33500). For SR-33000, "On" = switch closed.

Table 18. Switch point shift for signals referenced to Ref B / Ref2

Switch point relative to Ref. B ("Ref 2" on SR-33500)	NR: S3-4 SR-33000: S2-4 SR-33500: S101-4	NR: S3-5 SR-33000: S2-5 SR-33500: S101-5	NR: S3-6 SR-33000: S2-6 SR-33500: S101-6
-1.0 line	On	On	On
-0.5 line	Off	On	On
Coincident **(default)**	On	Off	On
+0.5 line	Off	Off	On
+1.0 line	On	On	Off
+1.5 line	Off	On	Off

+2.0 line	On	Off	Off
+2.5 line	Off	Off	Off

Table 19 shows the switches providing adjustment relative to SR-33500 Reference 3.

Table 19. Switch point shift for signals referenced to Ref 3.

Switch point relative to Ref. 3	SR-33500: S102-1	SR-33500: S102-2	SR-33500: S102-3
-1.0 line	On	On	On
-0.5 line	Off	On	On
Coincident **(default)**	On	Off	On
+0.5 line	Off	Off	On
+1.0 line	On	On	Off
+1.5 line	Off	On	Off
+2.0 line	On	Off	Off
+2.5 line	Off	Off	Off

The switches that provide adjustment relative to SR-33500 Reference 4 are shown in Table 20.

Table 20. Switch point shift for signals referenced to Ref 4.

Switch point relative to Ref. 4	SR-33500: S102-4	SR-33500: S102-5	SR-33500: S102-6
-1.0 line	On	On	On
-0.5 line	Off	On	On
Coincident **(default)**	On	Off	On
+0.5 line	Off	Off	On
+1.0 line	On	On	Off
+1.5 line	Off	On	Off
+2.0 line	On	Off	Off
+2.5 line	Off	Off	Off

Figure 56. NR-33000 NIC/Sync/OPM board

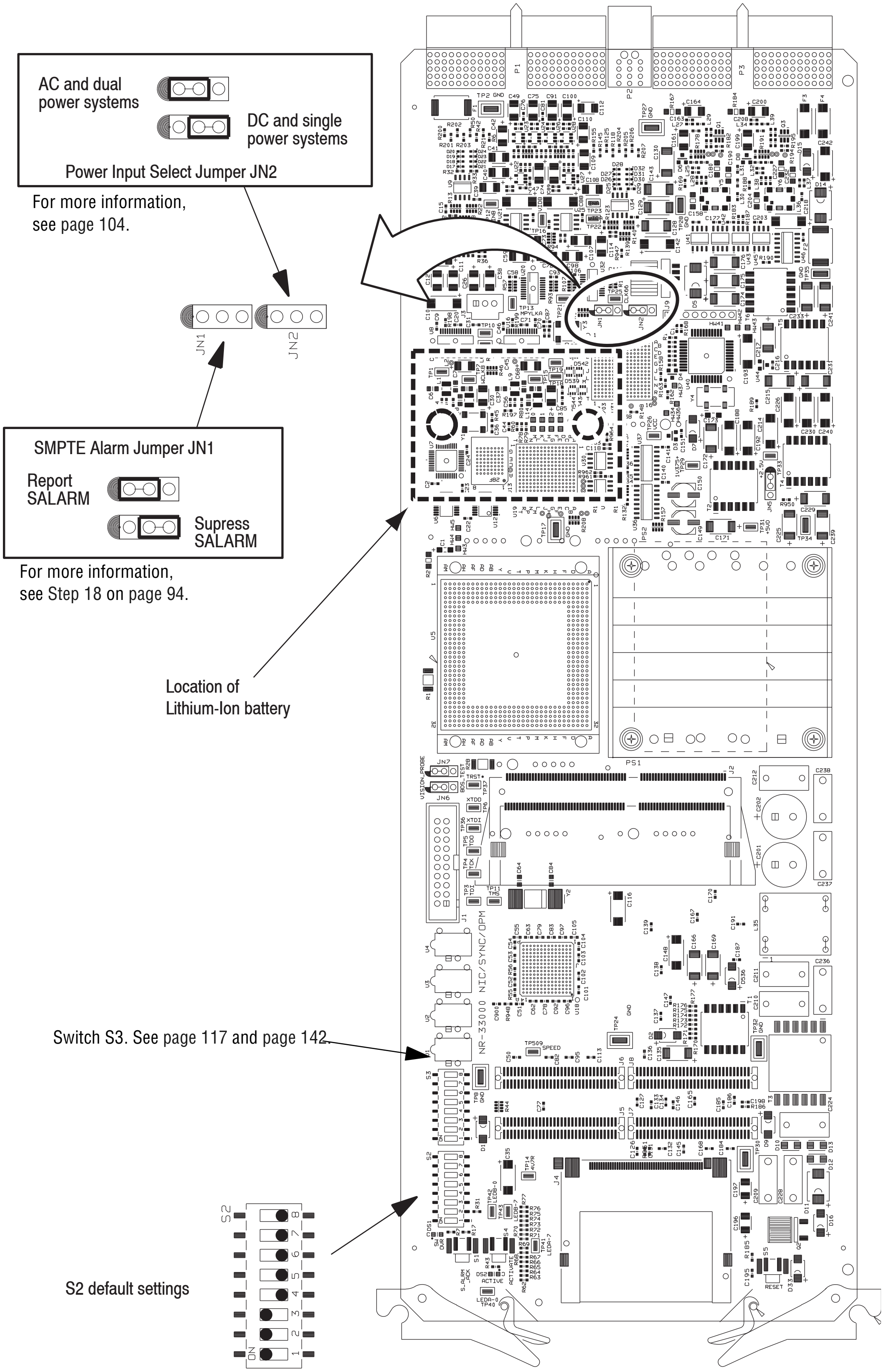


Figure 57. SR-33000 Sync/OPM reference card

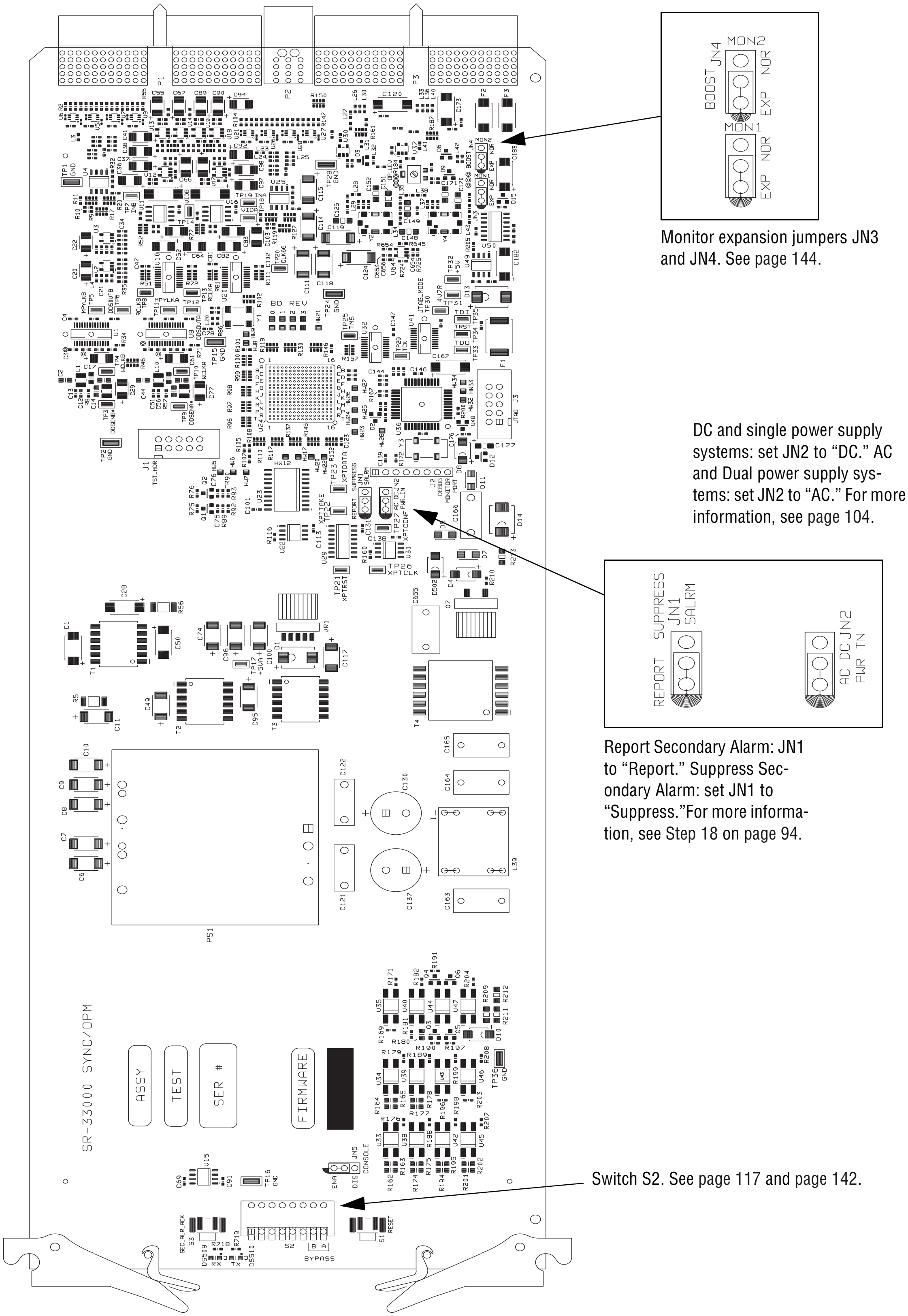
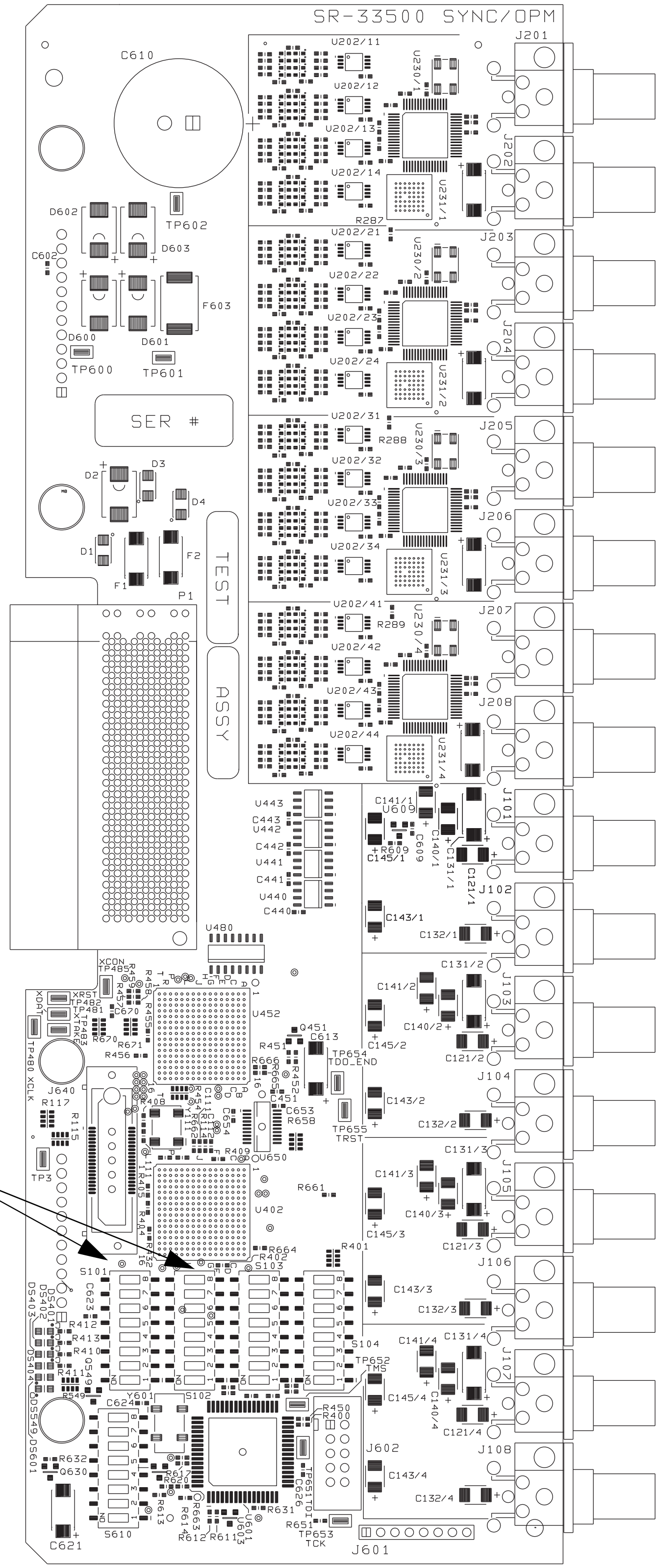


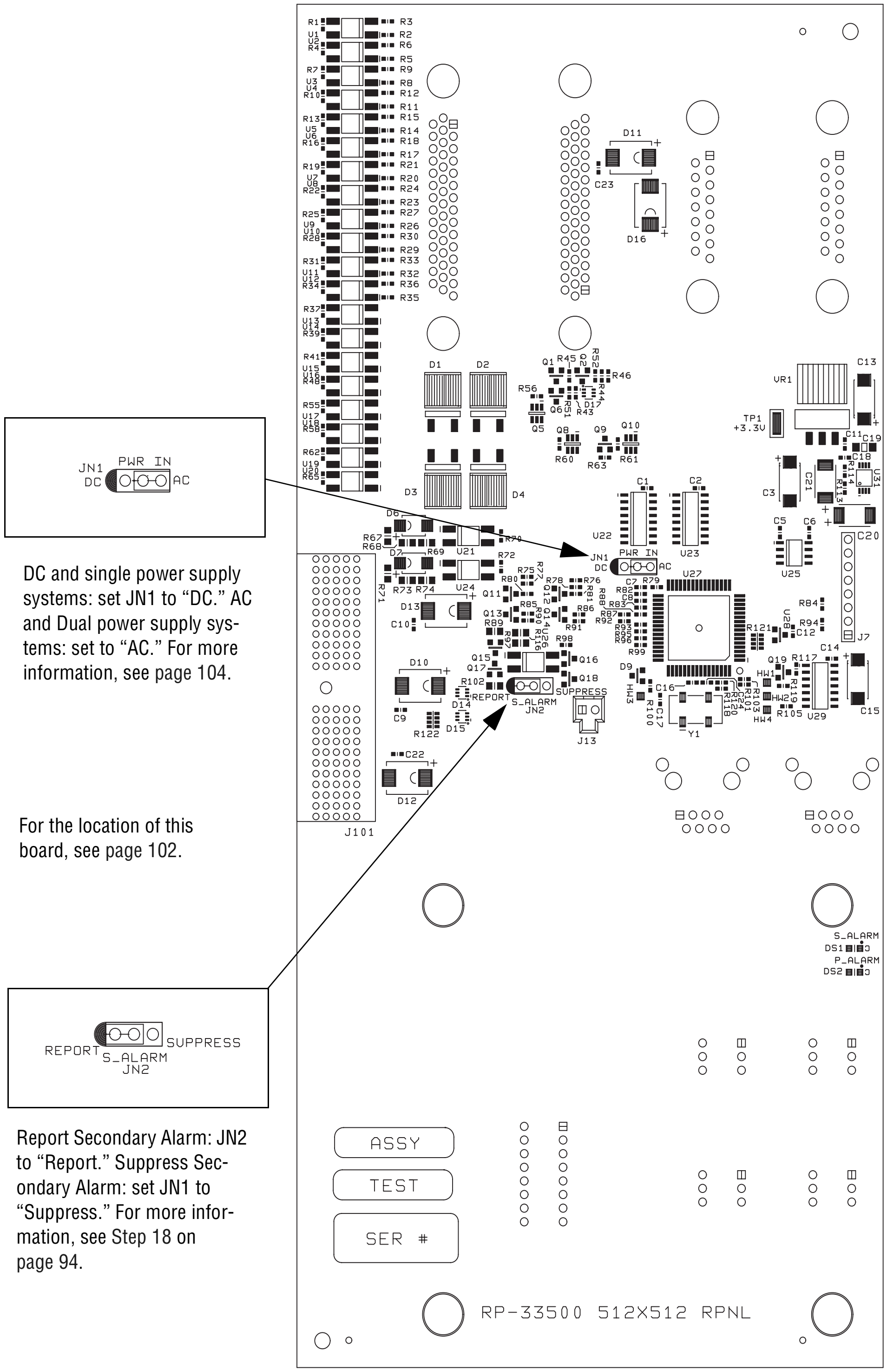
Figure 58. SR-33500 Sync/OPM reference card



Switches S101 and S102. See page 117 and page 142.

DIP switches S103, S104, and S610 are reserved for future use. The default setting for these switches is “Open.”

Figure 59. RP-33500 512 x 512 Rear Panel board



Output Board Configuration

This adjustment applies to systems with more that one sync reference. Each output board provides a block of 32 outputs and by factory default each block is assigned to sync reference 1. If additional references are used, DIP switch S5 on each output board is used to assign the board to one of four possible sync lines.

Figure 60.

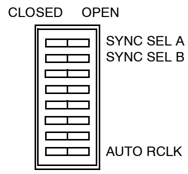


Table 21.

Sync line	Sync Sel A switch	Sync Sel B switch
1	Closed	Closed
2	Open	Closed
3	Closed	Open
4	Open	Open

Duplication and Expansion

As described in the Planning section of this manual (starting on page 43), Trinix routers are designed to duplicate/expand inputs and outputs using passive splitter/combiner expansion panels. Whenever an expansion panel is connected, signal gain must be increased to compensate for the added circuitry.

In addition, unused connectors should be terminated for optimum performance.

Note For Jupiter-controlled (0-based) systems, the input/output numbers in the following discussion should be decreased by one (1). For example, block 1-256 should be understood as block 0-255, etc.

Note Frame numbers are determined by the input/output blocks served by the particular frame. E.g., for a DV-33256 router, input block 1-256 and output block 1-256 must be connected to frame zero. For more information about frame numbering, see page 146.

Note Unused connectors should be terminated for optimum performance.

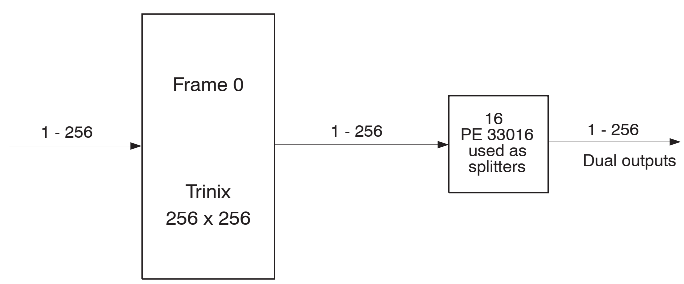
Output Duplication

Output duplication (dual/quad outputs) requires output splitters and output gain increase.

Full chassis output duplication

In this arrangement all outputs from a given chassis are duplicated and must therefore be boosted. See Figure 61 for an example.

Figure 61.



The necessary gain increase is accomplished by

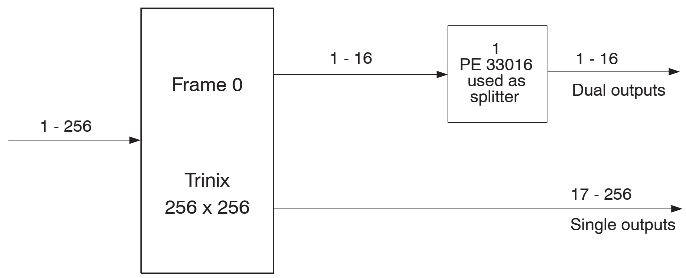
- Closing the rear-panel *Input Expand* DIP switch (for the location of this switch, see page 98 [128 x 128]; page 100 [256 x 256]; or page 102 [512 x 512]), and
- Setting the *output* board jumpers (or DIP switches) to the “Expand Enable” position (as shown on page 128 and page 129).

Partial Chassis Output Duplication

As previously described (starting on page 43), the PE-33016 Port Expander can be used to provide dual outputs in blocks of 16 outputs, while the PE-33008 Port Expander can be used to provide quad outputs in blocks of 16 outputs.

For example, Figure 62 shows outputs 1-16 with dual outputs and the remainder with single outputs.

Figure 62.



In this example:

- For SO-33110/33011 and HO-33110/33011 output boards, the gain for outputs 1-16 would be boosted by closing the rear-panel *Input Expand* DIP switch and verifying that the **on-board jumper** for that set of outputs is in the “Expand Enable” position. The location of the boost jumper on these output boards is shown on page 128. The gain for outputs 17-256 must be held at unity by setting the on-board jumpers for that set of outputs to the “Force Normal” position; this overrides the rear-panel DIP switch setting for those outputs.
- For HO-33120/33121 output boards, the gain for outputs 1-16 would be boosted by closing the rear-panel *Input Expand* DIP switch and verifying that the **on-board DIP switch** for those outputs is closed. The location of the DIP switches for these boards is shown on page 129. The gain for outputs 17-256 must be held at unity by opening the on-board DIP switches for that set of outputs; this will override the rear-panel DIP switch setting for those outputs.

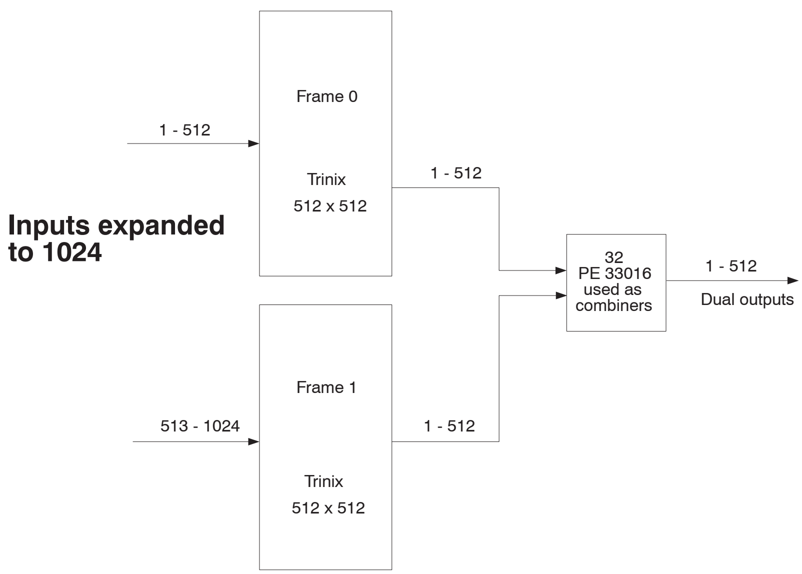
Input Expansion

Input expansion requires *output* combiners and *output* gain increase.

Full Chassis Input Expansion

In this arrangement all outputs are combined and must therefore be boosted. For example, in the system shown in Figure 63, Output 1 of Frame 0 would be combined with Output 1 of Frame 1, Output 2 of Frame 0 would be combined with Output 2 of Frame 1, etc.

Figure 63.



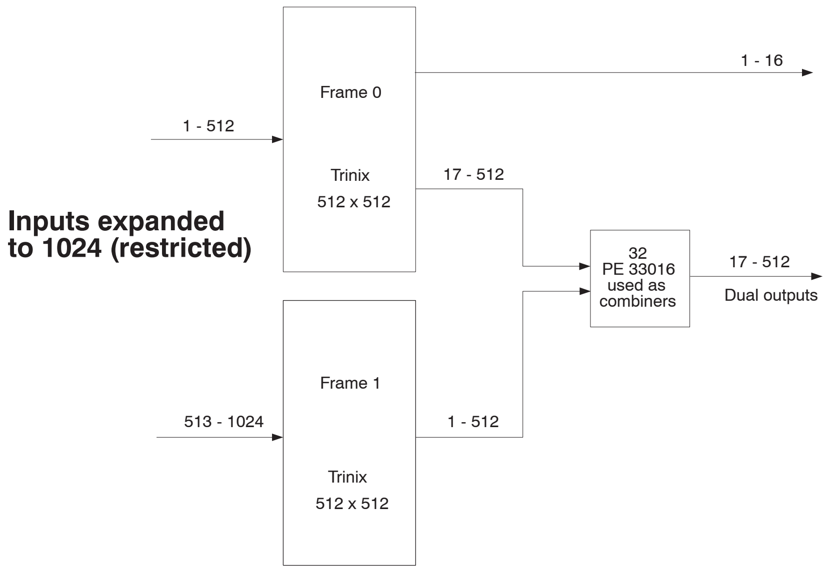
The necessary gain increase is accomplished by

- Closing the rear-panel *Input Expand* DIP switch (for the location of this switch, see page 98 [128 x 128]; page 100 [256 x 256]; or page 102 [512 x 512]), and
- Setting the *output* board jumpers (or DIP switches) to the "Expand Enable" position (as shown on page 128 and page 129).

Restricted Input Expansion

In this case one or more output blocks are *not* combined and are therefore *not* boosted. For example, in the system shown in Figure 64, Outputs 1-16 of Frame 0 are not combined (and therefore are restricted to inputs 1-512).

Figure 64.



In this example:

- For SO-33110/33011 and HO-33110/33011 output boards, the gain for outputs 17-512 would be boosted by closing the rear-panel *Input Expand* DIP switches on both chassis and verifying that the **on-board jumpers** for that set of outputs are in the “Expand Enable” position. The location of the boost jumper on these output boards is shown on page 128. The gain for outputs 1-16 must be held at unity by setting the on-board jumper for that set of outputs to the “Force Normal” position; this overrides the rear-panel DIP switch setting for those outputs.
- For HO-33120/33121 output boards, the gain for outputs 17-512 would be boosted by closing the rear-panel *Input Expand* DIP switches on both chassis and verifying that the **on-board DIP switches** for those outputs are closed. The location of the DIP switches for these boards is shown on page 129. The gain for outputs 1-16 must be held at unity by opening the on-board DIP switch for that set of outputs; this will override the rear-panel DIP switch setting for those outputs.

Figure 65. Location of gain jumpers on SO-33110/33011 and HO-33110/33011 output boards.

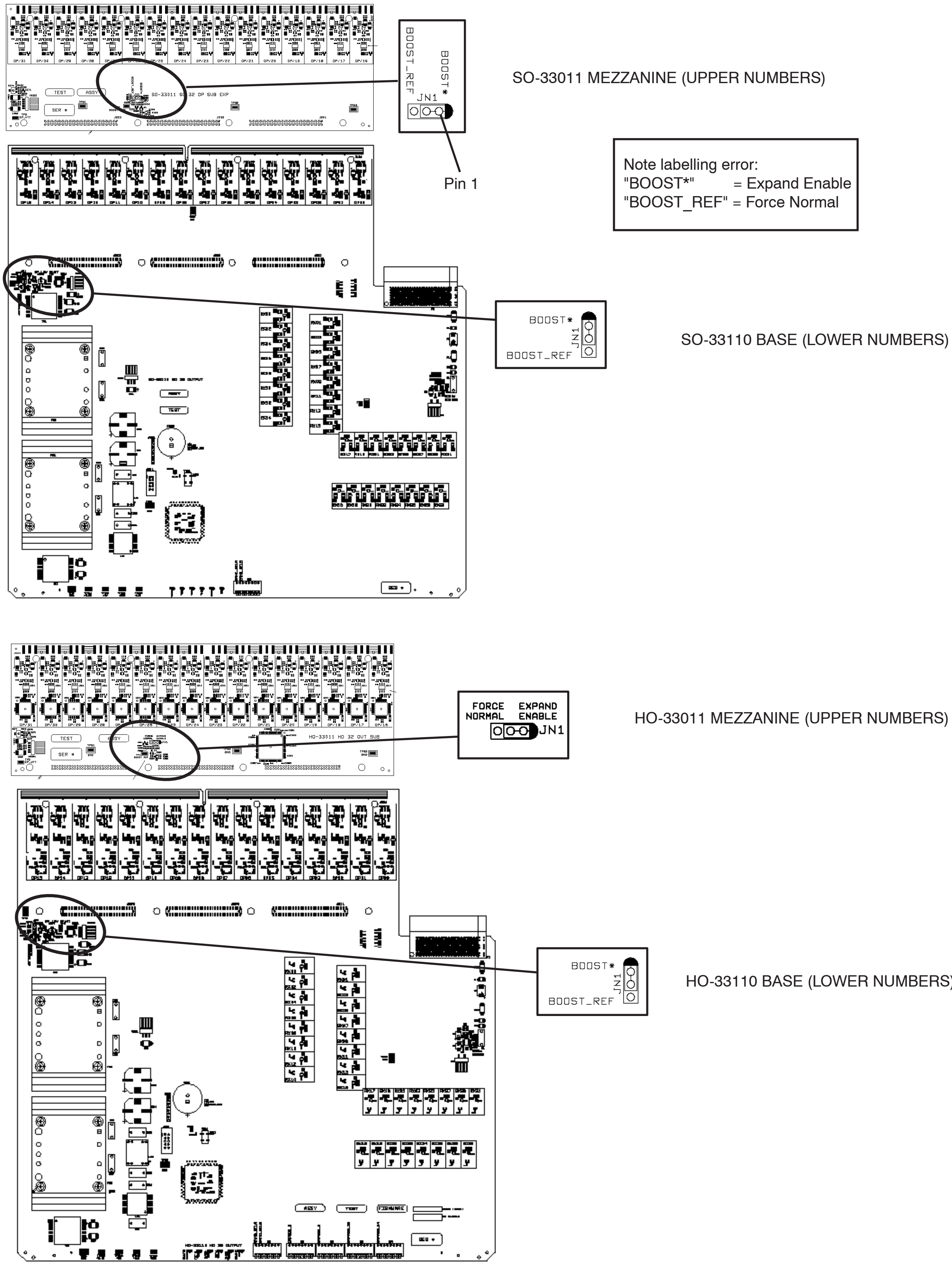


Figure 66. Location of gain switches for HO-33120 Universal Output base board and HO-33121 Universal Output mezzanine board.

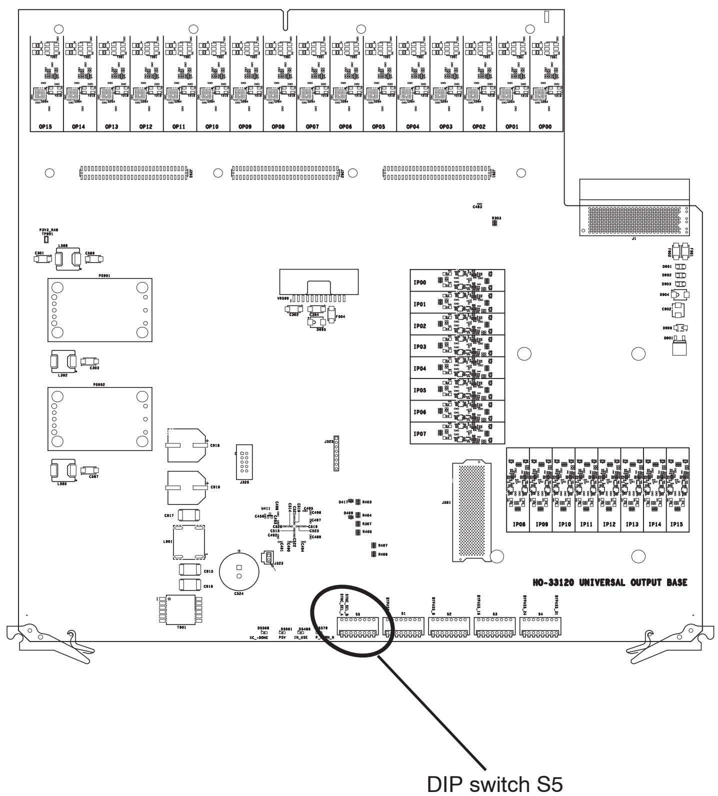


Table 22. HO-33120 DIP switch S5 settings. Refer to example discussion on page 128.

	S5-3 HO-33120 Base board (lower numbered outputs)	S5-4 HO-33121 Mezzanine board (upper numbered outputs)
Expand Enable: Use rear-panel "Input Expand" boost switch setting for these 16 outputs	Closed	Closed
Force Normal: Hold gain at unity (do not boost) these 16 outputs. This setting overrides the rear panel switch.	Open	Open

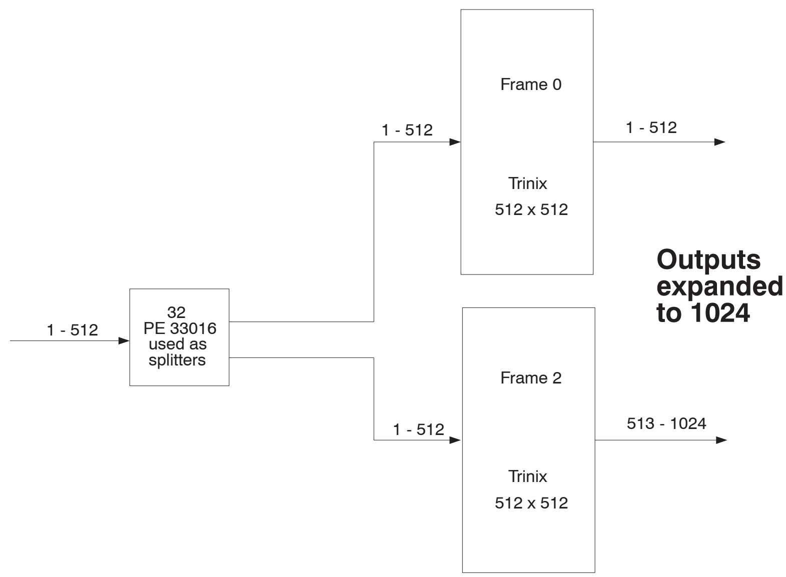
Output Expansion

Output expansion requires *input* splitters and *input* gain adjustment.

Full Chassis Output Expansion

In this arrangement all inputs are split and must therefore be boosted. For example, in the system shown in Figure 67, Input 1would be split (duplicated) and sent to both chassis, etc.

Figure 67.



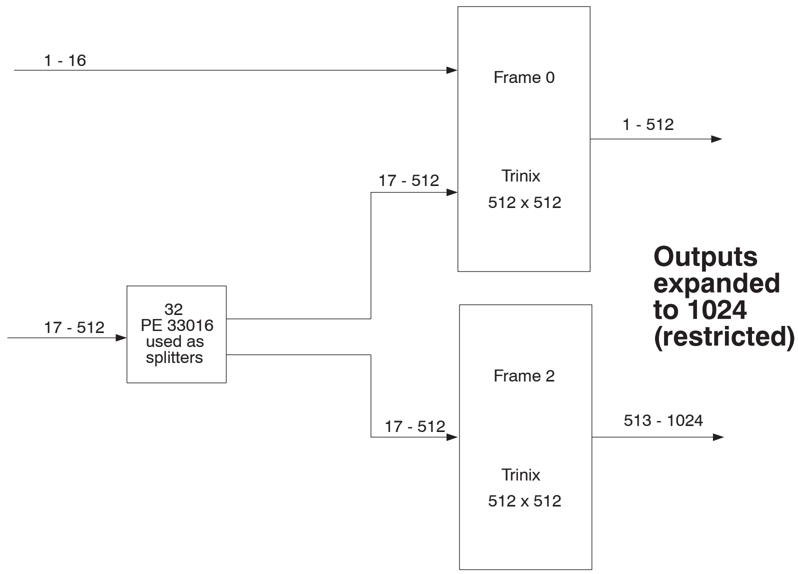
The necessary gain increase is accomplished by

- Closing the rear-panel *Output Expand* DIP switch (for the location of this switch, see page 98 [128 x 128]; page 100 [256 x 256]; or page 102 [512 x 512]), and
- Setting the *input* board jumpers or switches to the “Expand Enable” position (as shown on page 132 and page 133).

Restricted Output Expansion

In this application one or more input blocks are *not* passed through a splitter and are therefore *not* boosted. For example, in the system shown in Figure 68, inputs 1-16 are not split (and therefore are restricted to outputs 1-512).

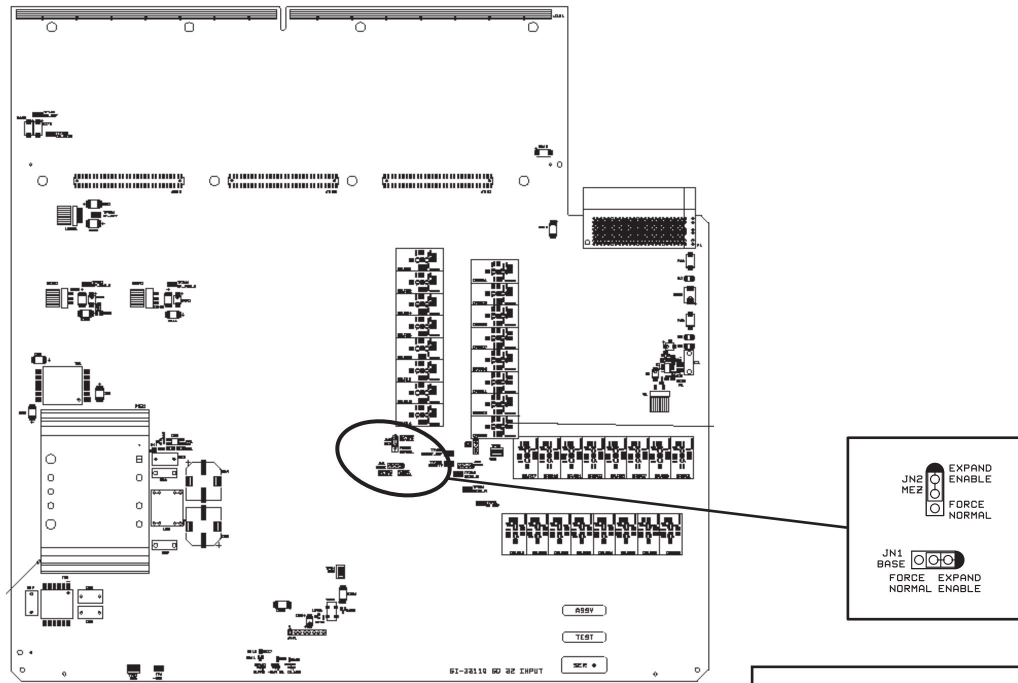
Figure 68.



In this example:

- For SI-33110 and HI-33110 input boards, the gain for inputs 17-512 would be boosted by closing the rear-panel *Output Expand* DIP switches on both chassis and verifying that the **on-board jumpers** for that set of inputs are in the “Expand Enable” position. The location of the boost jumpers on these input boards is shown on page 132. (“Base” refers to the 16 lower-numbered inputs to the main board; “Mez” refers to the 16 higher-numbered inputs to the mezzanine board.) The gain for inputs 1-16 must be held at unity by setting the on-board jumper for that set of inputs to the “Force Normal” position; this overrides the rear-panel DIP switch setting for those inputs.

Figure 69. Location of gain jumpers on SI-33110 input board. HI-33110 is similar.



Note labelling error:
Some "Base" jumpers have reversed silkscreening. In all cases, "Expand Enable" requires a jumper between pins 1 and 2.

Figure 70. Front-edge switches on VI-33100 base board. HI-33200 has SW543 only (other front-edge switches are not stuffed)

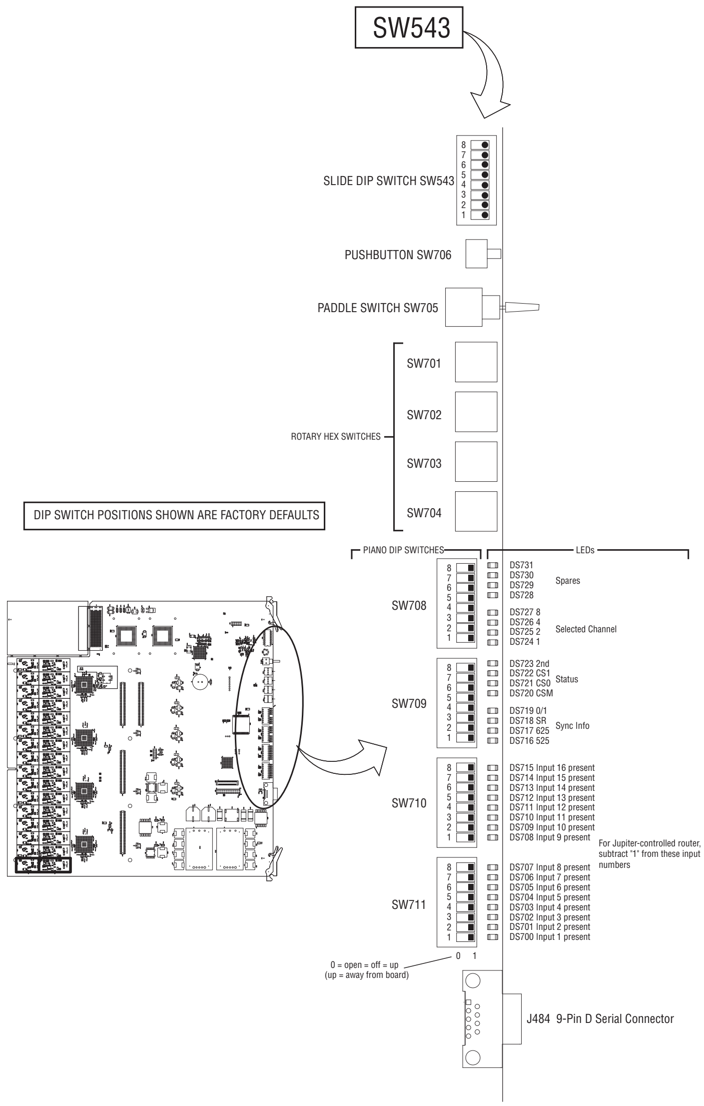


Table 23. Output expansion gain switches for VI-33100 and HI-33200

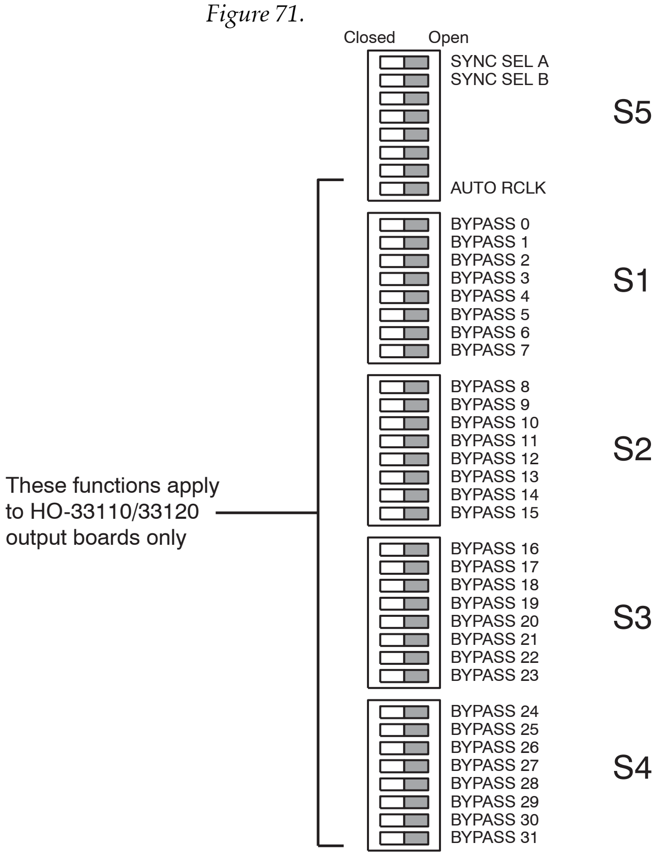
	SW543-3 Affects Base board (lower numbered outputs)	SW543-4 Affects Mezzanine board (upper numbered outputs)
Expand Enable: Use rear-panel "Output Expand" boost switch setting for these 16 inputs	On (Closed)	On (Closed)
Force Normal: Hold gain at unity (do not boost) these 16 inputs. This setting overrides the rear panel switch.	Off (Open)	Off (Open)

Output Reclocker Bypass Settings

The following discussion applies to units equipped with the HO-33110 HD or the HO-33120 SD/HD Output Boards.

Front edge DIP switches S5-8 and S1 through S4 on these output boards are used to control reclocking.

Figure 71.



Switch settings are shown in Table 24.

Table 24. Reclock settings for HD output boards.

	S5-8 "AUTO RCLK"	Switch on S1 through S4
Reclock all outputs if possible. Bypass unlocked outputs. (Default setting)	Closed	All closed
Bypass all outputs	Open	All open
Reclock selected outputs if possible, otherwise turn OFF. Bypass all other outputs	Open	Closed for selected outputs. All others open

"Reclock if possible" means the signal will be checked to see if it is properly formed and running at a standard data rate supported by this board model. If so, the signal will be reclocked.

"Bypass" means the signal will not be reclocked.

A list of supported data rates for the HO-33110 and HO-33120 Output Boards is shown on page 79.

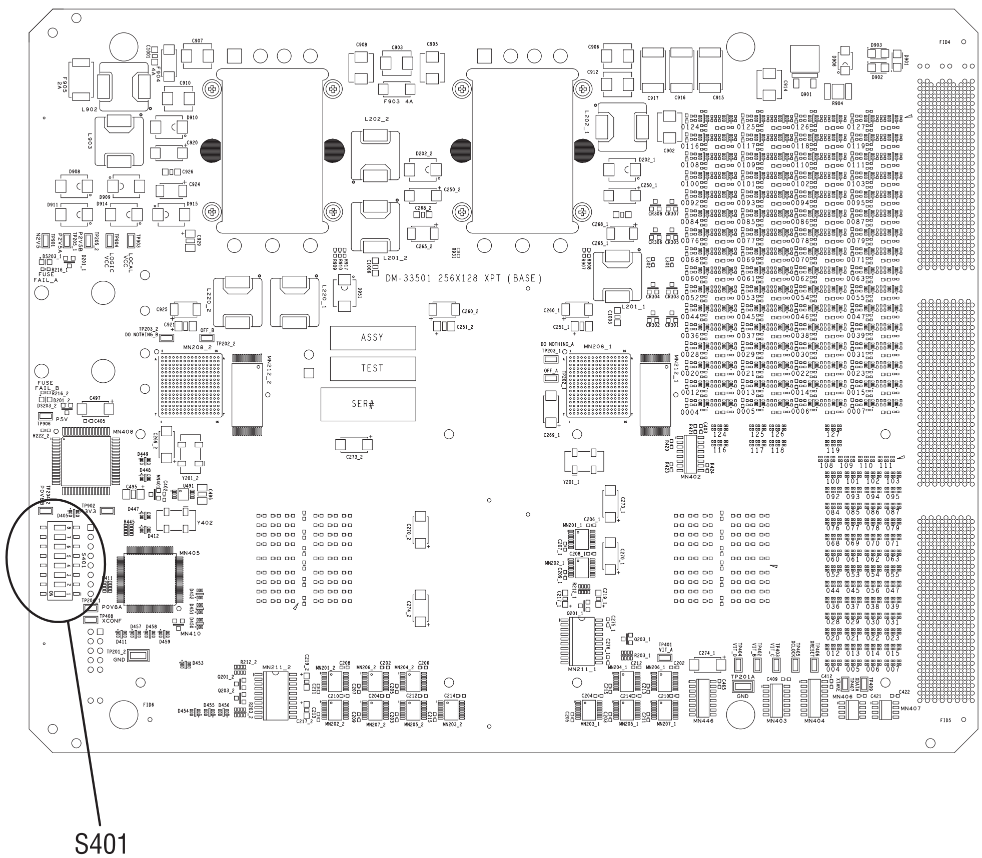
Sync Selection Switch S5

See page 123.

Input Equalization Settings (DV-33512 Models Only)

Recent versions of the DM-33512 Digital Matrix boards used in DV-33512 routers have additional input equalization for improved HD performance; these boards are identified with “Pre-emphasis Added” stickers on the J421 headers used to connect the two halves of the board. If these stickers are present, and you are operating with Broadlinx 2.4 software or newer, DIP switches S401-7 and S401-8 (on both boards) should be set to “On;” if the stickers are not present, these switches should be set to “Off.” The remaining six switches on S401 are always set to “Off.” See Figure 72.

Figure 72. DM-33501 Digital Matrix board. DM--33502 is similar



Output Monitoring

Output monitoring allows verification of switcher performance without interrupting normal operations. A separate internal switching system is used to switch the Monitor Output to any output of the switcher.

Using a control panel, the operator picks an output as usual—in this case, the Monitor Output. The operator then selects an *input*, but this input is actually one of the switcher *outputs.*

With the DV-33128 and DV-33256 chassis, two pairs of output monitor ports are provided by the NR-33000 board (one side of each pair is inverted). Two additional dual ports are optionally available when a second NR-33000 is added; this would provide a total of four monitor ports.

With the DV-33512 chassis, the SR-33500 Sync/OPM board provides four monitoring ports.

For configurations that require multiple chassis, the monitor signals are brought through a PE-33016 Port Expander used as a combiner (see page 144).

Examples of basic monitoring connections are shown below.

Figure 73. Example of output monitor connection for 128 x 128 all-NTSC switcher.

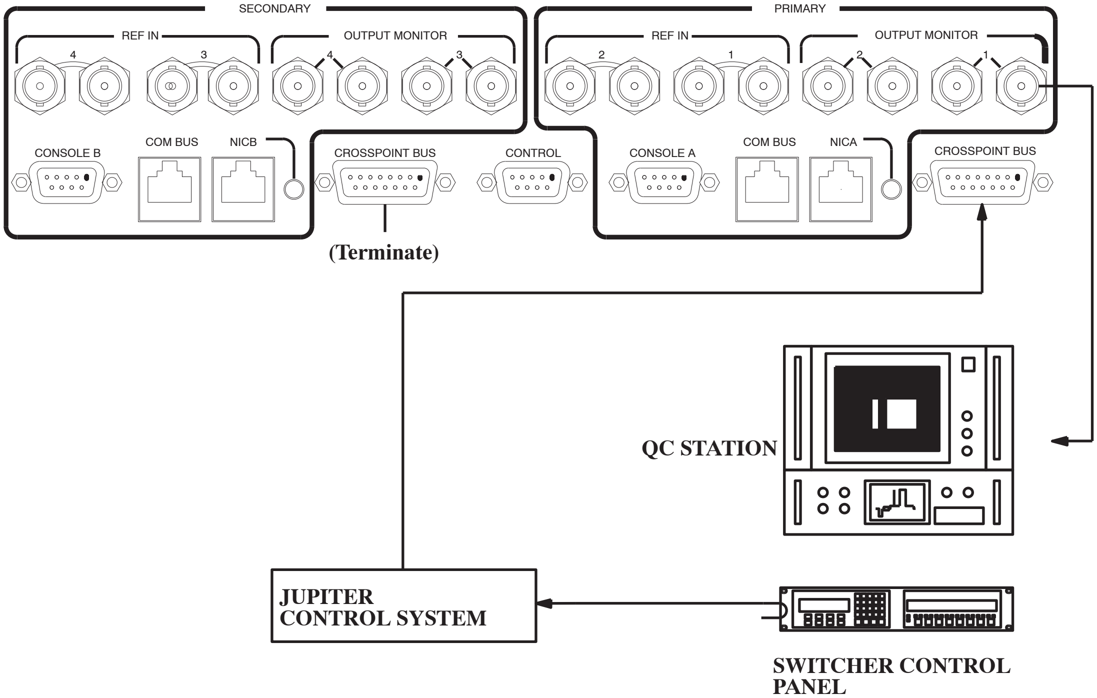


Figure 74. Example of output monitor connection for 256 x 256 all-NTSC switcher.

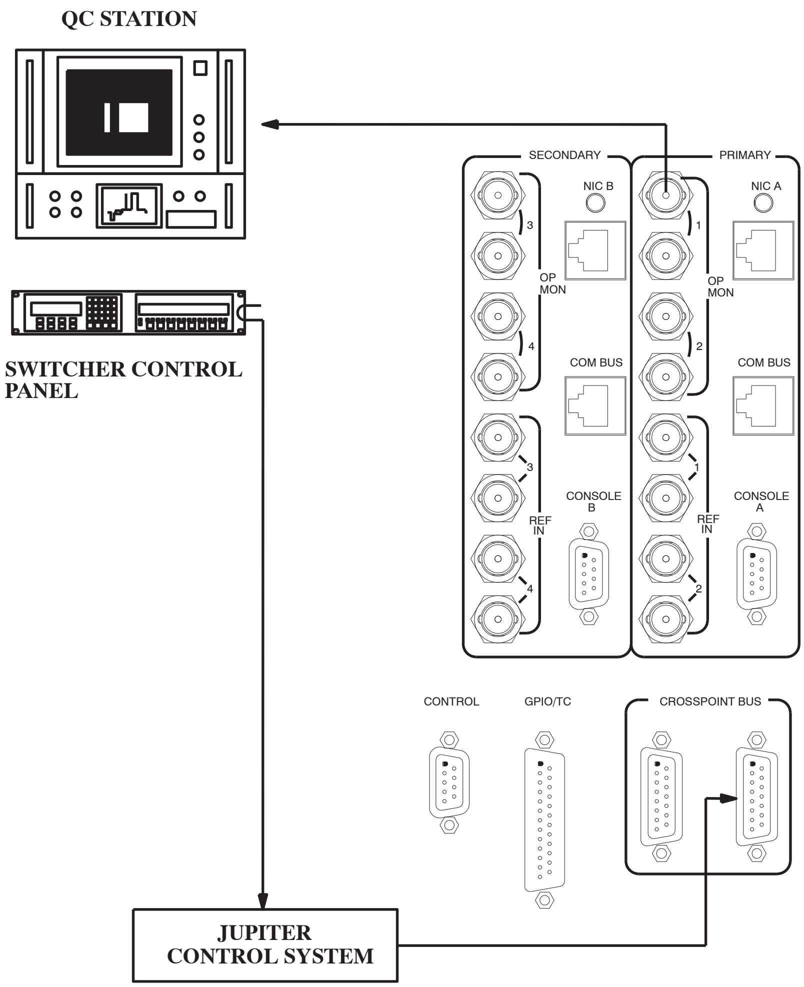
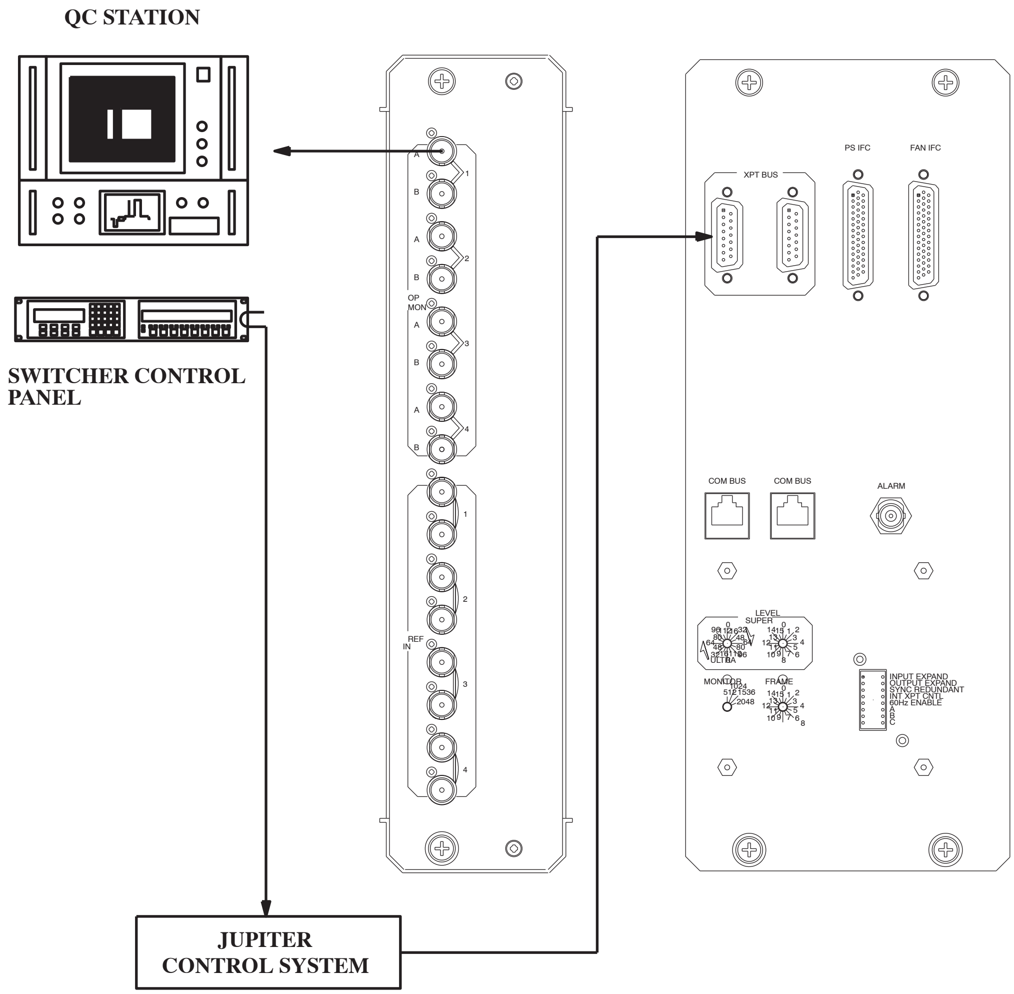
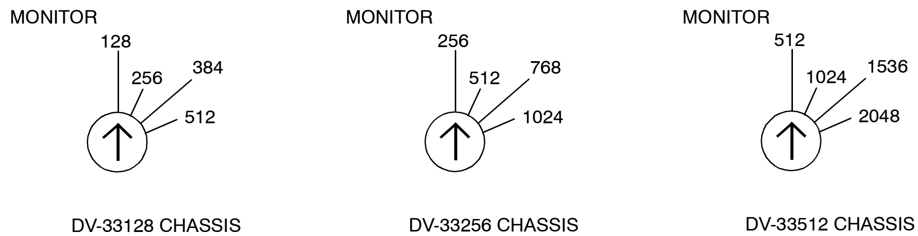


Figure 75. Example of output monitor connection for 512 x 512 all-NTSC switcher.



Setting the Output Monitor Address

Figure 76. Output Monitor Address Switches



Note On all the rotary switches, use the triangular arrowhead for pointing (not the screwdriver slot).

Note Some units in the field may have incorrect labels on these switches. The labels shown in Figure 76 are correct.

The “Monitor” rotary switch on the back panel is used to set the control address for the available monitor outputs. For example, with a 128 x 128 switcher equipped with redundant NR-33000 boards, the quality control monitor could be connected to output monitor connector “1” and the monitor switch set to “128”; the control system would then select Output 129* for monitoring purposes. See Table 25 on page 142.

If the router has been output-expanded (as described on page 144), then each Monitor switch would be set to the highest output number for the system. For example, if a DV-33128 has been output-expanded to 128 x 256, the Monitor switch would be set to “256” on both chassis.

The second BNC connector of each pair provides an inverted output signal.

*For Jupiter-controlled (0-based) systems, subtract one (1) from these numbers.

Table 25.

DV-33128 (128 X 128)						DV-33256 (256 X 256)				
Monitor Switch	Output Number and Address					Monitor Switch	Output Number and Address			
	1	2	3	4			1	2	3	4
128	129*	130*	131*	132*		256	257*	258*	259*	260*
256	257*	258*	259*	260*		512	513*	514*	515*	516*
384	385*	386*	387*	388*		768	769*	770*	771*	772*
512	513*	514*	515*	516*		1024	1025*	1026*	1027*	1028*

Table 26.

DV-33512 (512 X 512)				
Monitor Switch	Output Number and Address			
	1	2	3	4
512	513*	514*	515*	516*
1024	1025*	1026*	1027*	1028*
1536	1537*	1538*	1539*	1540*
2048	2049*	2050*	2051*	2052*

Output Monitor Reclock / Force Bypass Settings

DV-33128 and DV-33256

For these models, "Auto detect on" means the signal will be checked to see if it is HD or SD. If HD, the signal will be reclocked. If the signal is SD, it will be bypassed.

NR-33000 Monitor Output switches "Bypass B" S3-7 and "Bypass A" S3-8 select "auto detect on" or "force bypass" for the Monitor outputs. "Auto Detect" ("ON") is the default setting. DIP switch S3 is shown on page 119.

– If the NR board is in the Primary slot, S3-8 (labelled "A") applies to Monitor Output 1; S3-7 (labelled "B") applies to Monitor Output 2.

*For Jupiter-controlled (0-based) systems, subtract one (1) from these numbers.

– If the NR board is in the Secondary slot, S3-8 (labelled “A”) applies to Monitor Output 3; S3-7 (labelled “B”) applies to Monitor Output 4.

SR-33000 Monitor Output switches “Bypass B” S2-7 and “Bypass A” S2-8 select “auto detect on” or “force bypass” for the Monitor outputs. “Auto Detect” (“CLOSED”) is the default setting. The location of DIP switch S2 is shown on page 120.

– If the SR board is in the Primary slot, S2-8 (labelled “A”) applies to Monitor Output 1; S2-7 (labelled “B”) applies to Monitor Output 2.

– If the SR board is in the Secondary slot, S2-8 (labelled “A”) applies to Monitor Output 3; S2-7 (labelled “B”) applies to Monitor Output 4.

DV-33512

For this model, “Auto detect on” means the signal (both HD and SD types) will be reclocked if possible. If the signal is not within reclocking limits, it will be bypassed.

SR-33500 Monitor Output switches S101 and S102 select “auto detect on” or “force bypass” for the four Monitor outputs. “Auto detect on” (switch ON) is the default setting. See Table 27. (The location of DIP switches S101 and S102 is shown on page 121.)

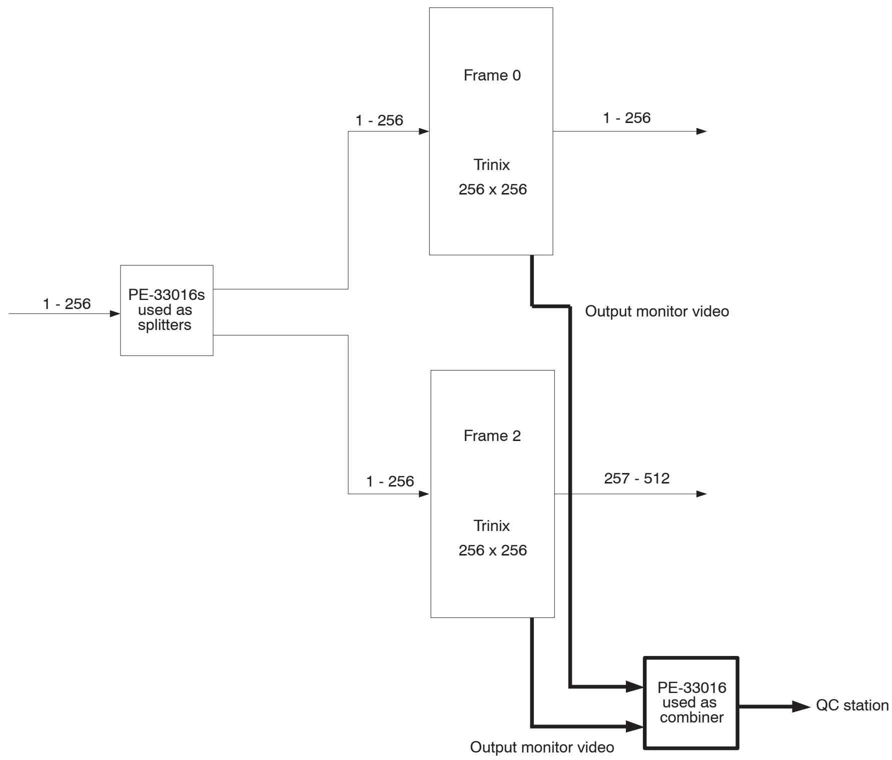
Table 27. SR-33500 Reclock/Bypass Settings for Monitor Outputs.

	Monitor 1 S101-7	Monitor 2 S101-8	Monitor 3 S102-7	Monitor 4 S102-8
Auto detect ON	ON	ON	ON	ON
Force bypass (do not reclock)	OFF	OFF	OFF	OFF

Monitoring with Expanded Systems

In expanded systems, output monitor signals must be brought through a combiner. An example of an output-expanded system in shown in Figure 77; and input-expanded system in shown in Figure 78.

Figure 77. Monitoring with Output-expanded System.



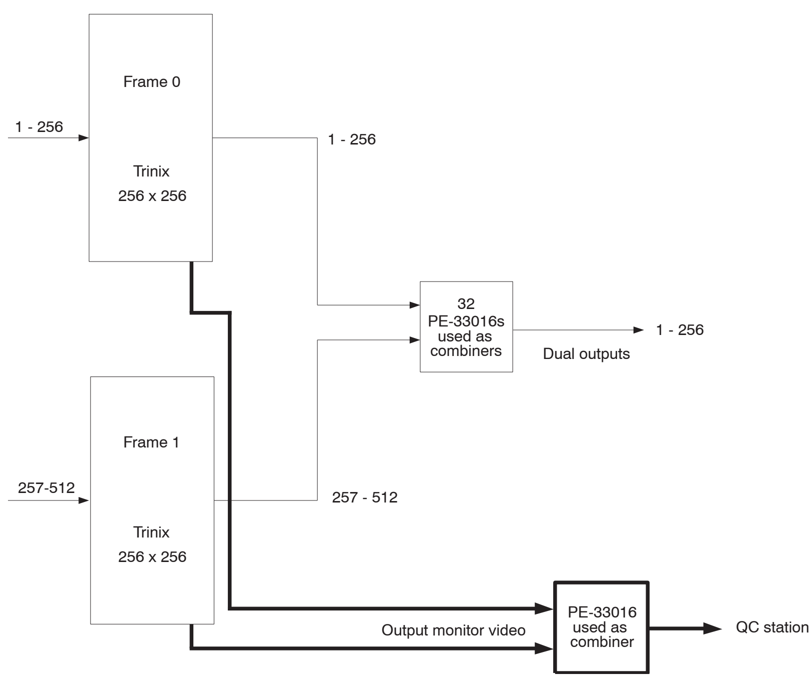


Figure 78. Monitoring with Input-expanded System.

For all expanded systems with Monitoring, the “B” switch on the rear of the chassis must be set to ON (closed). See page 98 (128 x 128); page 100 (256 x 256); or page 102 (512 x 512).

The “Monitor” switch must also be set to identify the total number of outputs (see page 141).

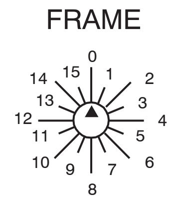
In systems controlled by SR-33000 boards, Monitor Expansion jumpers JN3 and JN4 on the SR-33000 boards must be set to “Exp.” See page 120.

Note Output monitoring is not available for input-expanded systems controlled by an SR-33000 Sync/OPM board.

Frame Number Settings

Setting the Chassis for Input/output Blocks

Figure 79.



Up to 16 Trinix chassis can be configured to operate as a single router. The FRAME rotary switch on the rear panel is used to indicate the relative position of each individual chassis to the input-output matrix.

The FRAME bits (4) are decoded to determine which inputs and outputs correspond to the chassis. Refer to the following tables for input and output relation to the FRAME bits.

Table 28.

DV-33128 (128 X 128)						DV-33256 (256 X 256)				
	FRAME NUMBER						FRAME NUMBER			
INPUTS						INPUTS				
385-512*	5	7	13	15		769-1024*	5	7	13	15
257-384*	4	6	12	14		513-768*	4	6	12	14
129-256*	1	3	9	11		257-512*	1	3	9	11
1-128*	0	2	8	10		1-256*	0	2	8	10
OUT-PUTS	1-128*	129-2556*	257-384*	385-512*		OUT-PUTS	1-256*	257-512*	513-768*	769-1024*

*For Jupiter-controlled (0-based) systems, subtract one (1) from these input/output numbers.

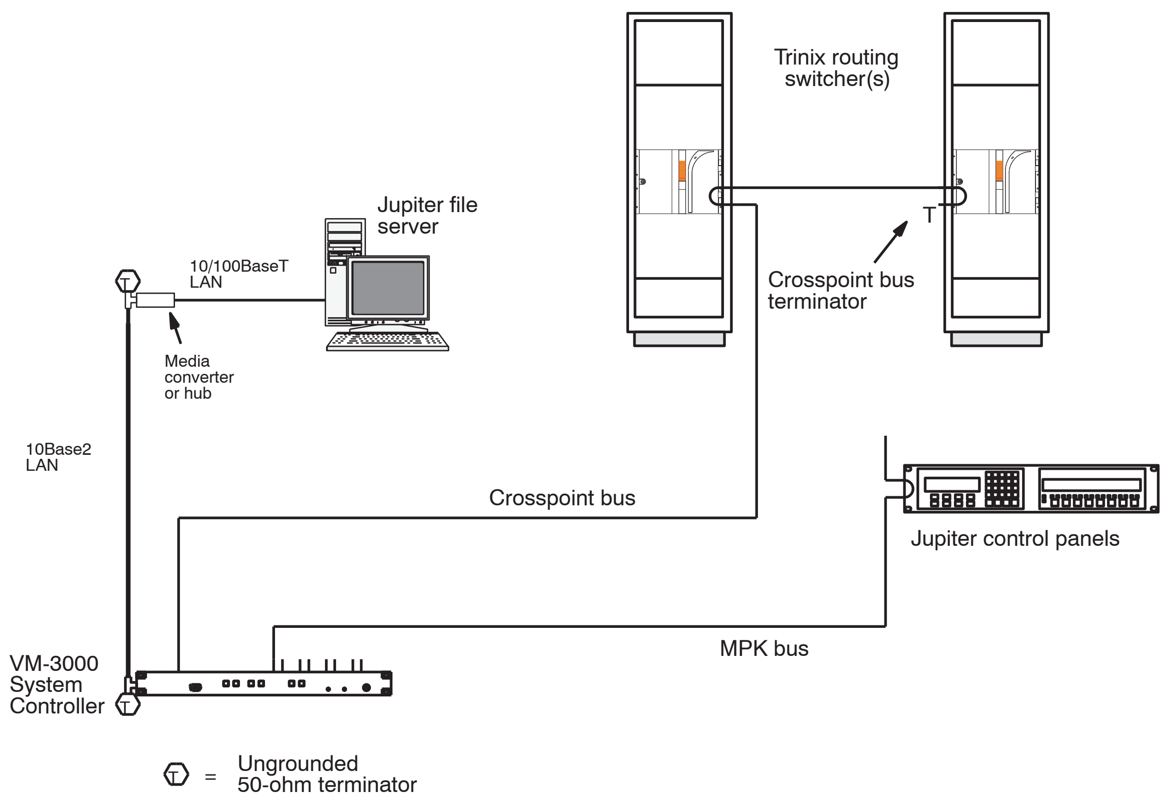
Table 29.

DV-33512 (512 X 512)				
	FRAME NUMBER			
INPUTS				
1537-2048*	5	7	13	15
1025-1536*	4	6	12	14
513-1024*	1	3	9	11
1-512*	0	2	8	10
OUTPUTS	1-512*	513-1024*	1025-1536*	1537-2048*

*For Jupiter-controlled (0-based) systems, subtract one (1) from these input/output numbers.

Jupiter Control

Figure 80. Control connections to Jupiter Facility Control System (example).



The Jupiter Facility Control System can be used to control the Trinix router using a VM-3000 System Controller (Figure 80). The VM can receive switching commands from a variety of serial sources, including Jupiter control panels or an automation computer. The new CM-4000 System Controller is also available as a control interface.

In this application, the Trinix is operated in the “external crosspoint bus control” mode, during which the Broadlinx board releases control of the crosspoint bus. Switch commands arriving at the crosspoint bus connector on the rear of the chassis will be executed.

1. Install the CC-2010 Matrix (crosspoint bus) cable.

   Interconnection from a Jupiter VM-3000 or CM-4000 control board is via crosspoint bus cable, which can be supplied in 3, 10, 25, or 50 foot lengths. The crosspoint bus ("XPT BUS") connector (15-pin D-connector) is looped out in order to connect the bus to the next item under crosspoint control.

   Depending on the size of the switcher this bus may require intermediate buffering through a CB-3000 Control Buffer. A CB-3000 is required in the following cases:

   DV-33128 - eight or more chassis
   DV-33256 - four or more chassis
   DV-33512 - two or more chassis

   The CB-3000 is described in detail in the Jupiter Installation and Operating manual.

   In Trinix applications, the crosspoint bus **must be terminated** at the point farthest from the control processor using a Crosspoint Bus Terminator, part number 01-053050-001.

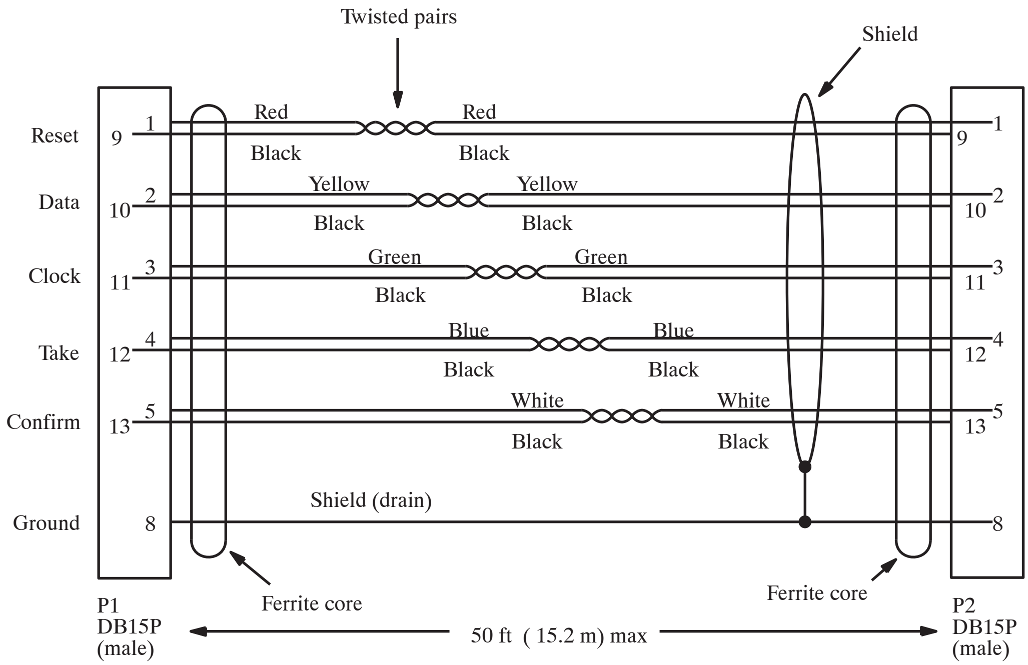
   The CC-2010 is a 10-conductor (plus ground) cable. Ready-made cables, with installed 15-pin D male connectors, are available from Grass Valley; see page 88.

   All rear-panel crosspoint bus connectors are 15-pin D, female.

   For specific wiring instructions concerning CC-2010 Crosspoint Bus Cables, please refer to the installation diagrams supplied with your switcher.

   For those who wish to prepare their own cables, pin-outs are shown in Figure 81 on page 150. The cable itself should be Belden 9505 or equivalent. Details concerning ferrite cores are given in Figure 82.

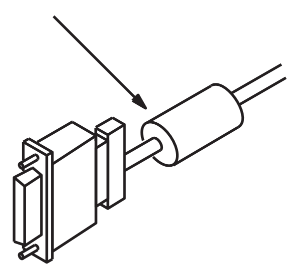
Figure 81. CC-2010 wiring. Reference: Assembly, CC-2010 Matrix Cable," Grass Valley drawing no. 01-032707-TAB



VDE EMI/RFI modifications to matrix cables

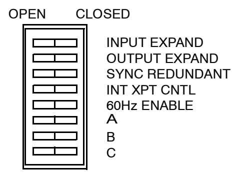
User-supplied matrix cables for VDE installations require a ferrite core over each end of the cable, adjacent to the connector.

Figure 82. Matrix cable VDE modifications.



2. Set the Trinix "INT XPT CNTL" rear-panel DIP switch to Off (switch open). See Figure 83.

Figure 83.



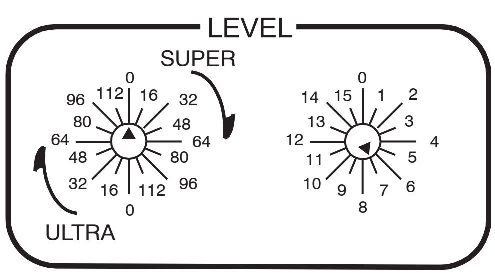
This will cause the Broadlinx board to release control of the Trinix internal crosspoint bus. Switch commands arriving at the crosspoint bus connector on the rear of the chassis will be executed.

3. Set Level switches:

Two back-panel rotary switches are used to set the level address of the router.

For Jupiter control "Super" crosspoint bus settings are used: the left-hand switch is turned to the appropriate most significant bit on the "Super" side of the switch. The least significant bit is set on the right switch. For example, to set the switcher level at "7" (the factory default for serial digital video) the left switch would be set at "Super 0" (straight up) and the right switch set to "7." See Figure 84.

Figure 84.



Note On all the rotary switches, use the triangular arrowhead for pointing (not the screwdriver slot).

4. For synchronous switching on all outputs, the same sync signal must be sent to the Jupiter and to the Trinix.

5. Connect the LAN and Com Bus as required.

In most cases, the Trinix should be connected to the facility LAN to allow system monitoring via the Broadlinx application. Com Bus connections will be needed for Broadlinx monitoring of DV-33512 and multi-chassis units. See page 155 and following.

6. Refer to the Jupiter VM-3000 System Controller Installation and Operation Manual, part no. 071 8305 xx or the Jupiter CM-4000 System Controller Installation and Operation Manual, part no. 071 8261 xx for control system installation details.

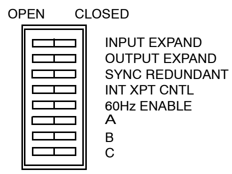
Note Newer-model Trinix units have “1-based” input/output connector numbering; i.e., there is no connector “0.” However, Jupiter tables are always 0-based. When controlling such units, references to Physical Input/Output connectors in Jupiter tables refer to that connector number plus 1. E.g., Physical Input 10 in the Jupiter Switcher Input table would correspond to connector number 11 on the Trinix rear panel.

SMS 7000 / Encore Control

These control systems use an Ethernet connection to the Broadlinx option (NR-33000 Sync/NIC/OPM board).

1. Set the Trinix "INT XPT CNTL" rear-panel DIP switch to On (switch closed). See Figure 85.

Figure 85.



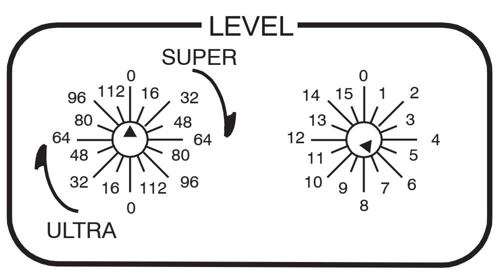
In the "internal crosspoint bus control" mode, the Broadlinx board sends commands to the crosspoint bus.

2. Set Level switches:

   Two back-panel rotary switches are used to set the level address of the router.

   a. For DV-33128 and DV-33256 units, "Super" crosspoint bus settings are used: the left-hand switch is turned to the appropriate most significant bit on the "Super" side of the switch. The least significant bit is set on the right switch. For example, to set the switcher level at "7" (the factory default for serial digital video) the left switch would be set at "Super 0" (straight up) and the right switch set to "7." See Figure 86.

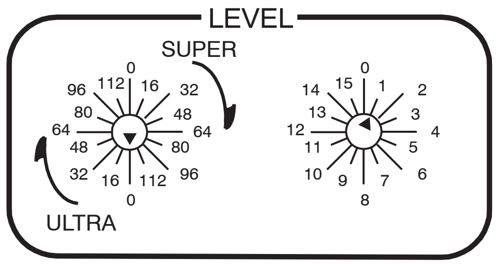
Figure 86.



Note On all the Trinix rotary switches, use the triangular arrowhead for pointing (not the screwdriver slot).

b. On DV-33512 units only, the rear-panel rotary Level switch must be set to “Ultra” crosspoint bus, Level 1; i.e., the Super/Ultra rotary switch must be pointed straight down to “0” and the adjacent rotary switch must point at “1.” These restrictions do not apply to DV-33128 and DV-33256 units. See Figure 87.

Figure 87.



3. On DV-33512 units only, a crosspoint bus cable must be installed between the power supply chassis and the main chassis.

If there is more than one DV-33512 in the system, the crosspoint bus must be daisy-chained between units.

The crosspoint bus must be terminated at the farthest point from the controlling Broadlinx board.

This connection is shown on page 102.

The crosspoint bus cable is described on page 149.

4. Install LAN components as described beginning on page 155.

5. Refer to the SMS 7000 or Encore documentation for control system configuration details.

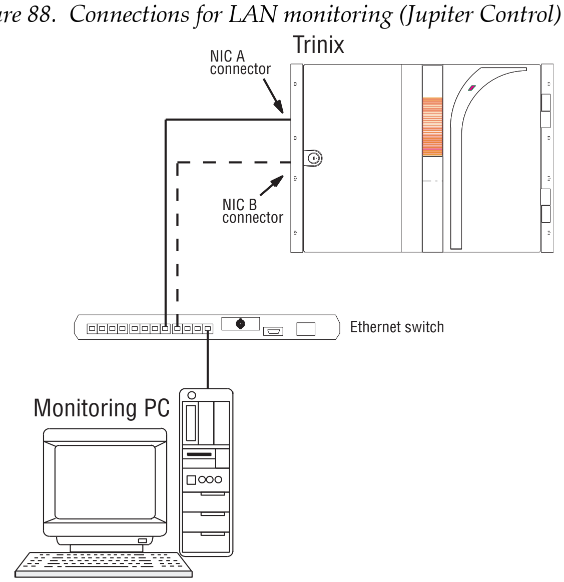
LAN and Com Bus Connections

The LAN (NIC) connections use a standard 10/100BaseT twisted pair cable with RJ-45 connectors (Cat 5E Enhanced is recommended). Shielded cable is also recommended, maximum length 60 meters.[1] Maximum length for unshielded cable is 100 meters.

LAN Monitoring Only (Jupiter Control)

In this arrangement the router is under Jupiter control and the only purpose of the connection is LAN monitoring using Broadlinx web pages or SNMP. See Figure 88.

Figure 88. Connections for LAN monitoring (Jupiter Control)



If you plan on using a secondary NR-33000 board connect another Ethernet cable from the "NIC B" jack to the network switch.

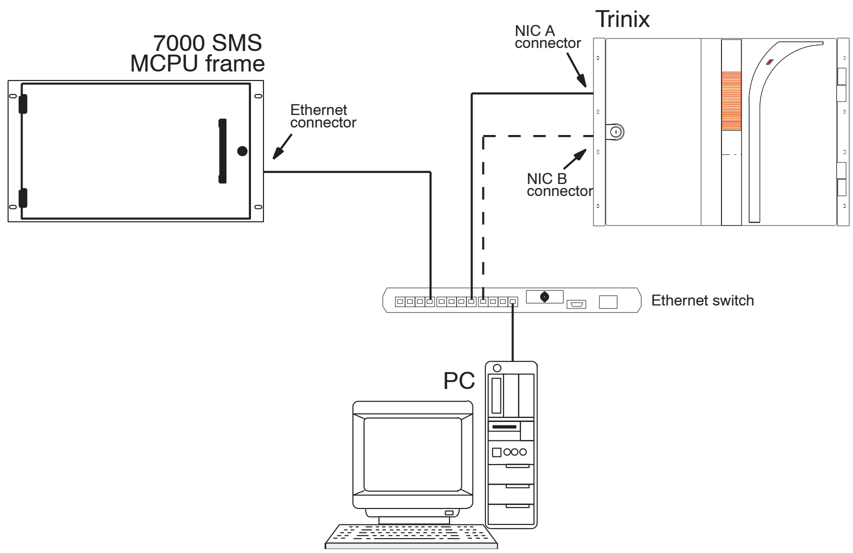
If the Trinix LAN is connected to the Internet the connection should be made through a firewall.

1. Compliance with EEC, EMC, EN series, UL- 1950, and CSA C22.2 No. 950-M89 standards requires use of a shielded cable.

SMS Control

In this arrangement the router is under SMS control via a LAN connection. The PC is used to configure the SMS and is also available for Broadlinx or SNMP monitoring. See Figure 89.

Figure 89. SMS connections to Trinix.



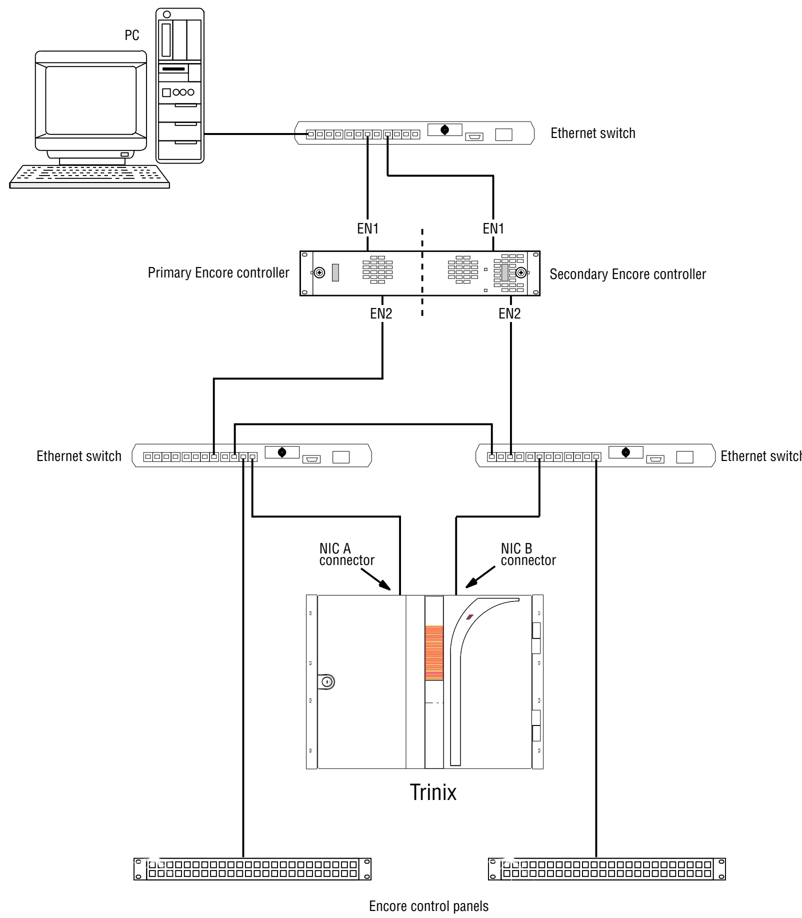
If you plan on using a secondary NR-33000 board connect another Ethernet cable from the "NIC B" jack to the network switch.

If the Trinix LAN is connected to the Internet the connection should be made through a firewall.

Encore Control

In this arrangement the router is under Encore control via a LAN connection. The PC is used to configure the Encore and is also available for Broadlinx or SNMP monitoring. Figure 90 shows the recommended connections when the system is equipped with redundant NR-33000 boards and redundant Encore controllers.

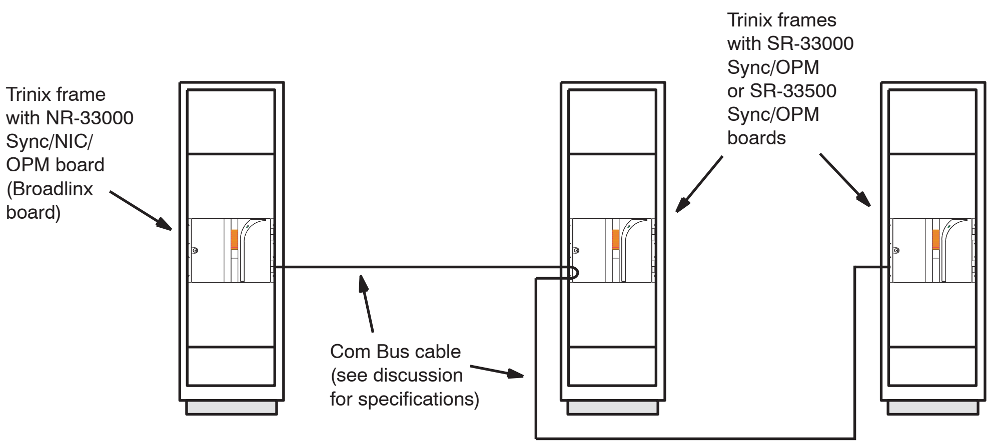
Figure 90. Encore connections to Trinix



Com Bus

In multi-frame systems, a "Com Bus" is used to loop through each frame, up to a maximum of four. The Com Bus is intended to provide switcher monitoring of multiple frames using Broadlinx web pages or SNMP. The Com Bus uses a 10/100BaseT (Cat 5 twisted pair) cable with RJ-45 connectors. Shielded cable is recommended, maximum length 60 meters.[1] Maximum length for unshielded cable is 100 meters.

Figure 91.



In **DV-33512** systems, if the power supply chassis is equipped with an NR-33000 Broadlinx board, install a Cat 5 twisted pair cable between the power supply chassis Com Bus connector associated with the NR board and one of the main chassis Com Bus connectors.

If there are additional DV-33512 main frames in the system, and they do not have Broadlinx boards, then the Com Bus should be daisy-chained to those frames also.

For an illustration, see page 102.

[1] Compliance with EEC, EMC, EN series, UL- 1950, and CSA C22.2 No. 950-M89 standards requires use of a shielded cable.

NR-33000 (Broadlinx) Board Configuration

Any use of the NIC (LAN) connector, whether for control or for monitoring, will require configuration of the NR-33000 board:

- To configure the board using Broadlinx web pages, refer to *Section 4-Broadlinx* on page 161.
- To configure the board using the Grass Valley NetConfig application, refer to the NetConfig Instruction Manual, part no. 071 8190 xx.

If SNMP/NetCentral monitoring is to be used, the Trinix SNMP agent residing on the NR-33000 board must be enabled (i.e., licensed). For more information, see *SNMP/NetCentral Monitoring* on page 23.

Section 4

Broadlinx

The Broadlinx option, which consists of Broadlinx software running on the NR-33000 Sync/NIC/OPM board, allows SMS 7000 or Encore control using Grass Valley CPL (Control Point Language) through an Ethernet connection.

Broadlinx also provides web pages for the following operations:

- Network configuration of the NR-33000 board(s)
- Downloading of software upgrades to the various boards in the system
- System monitoring using Internet Explorer

When licensed to do so, Broadlinx will also support SNMP/NetCentral monitoring.

Network Configuration

LAN devices used with Trinix (e.g., a monitor PC or the SMS system) must be on the same network as the Broadlinx board, or else be connected to the board through a network router.

The following applies to NR-33000 configuration using Broadlinx HTTP web pages. (For information about configuration using the NetConfig application, please refer to the NetConfig Instruction Manual, part no. 071 8190 xx. NetConfig includes a "discovery" feature which eliminates the need to change the PC IP setting during configuration.)

Simple Network

Where there is only a monitor PC and a Broadlinx board in an isolated network environment, change the monitor PC network address to be compatible with the Broadlinx board default setting, then browse to and configure the board as appropriate.

1. Make the PC's network settings compatible with the Broadlinx board's default values:
   a. Use the PC's Network Settings dialog to set the TCP/IP address to 192.168.253.201 and the subnet mask to 255.255.255.0. All other TCP/IP network settings are irrelevant at this point.

b. Reboot the PC to apply the changes.

If desired, you can use the MS-DOS **`ipconfig`** command to verify the settings.

If desired, these settings can be restored to their previous values once the Broadlinx board has been configured.

You must have admin privileges to change Internet settings on a Windows 2000 PC.

2. The Broadlinx board should be booted (or rebooted) at this time. One way to do this is to unseat and reseat the board:

a. The board can be unseated without turning off power.

b. To re-insert the board, keep the ejector levers spread apart and slide the board in until the levers make contact. Then fold the levers toward each other to seat the board.

c. Wait for the board to boot up fully (as indicated by the "spinning" pattern of the LEDs on the front edge of the board).

Note The Broadlinx board should be powered up (or rebooted) after all network connections have been made. Otherwise the board may fail to boot properly.

3. At the PC, start Microsoft Internet Explorer.

4. The Explorer Proxy setting must be turned off.

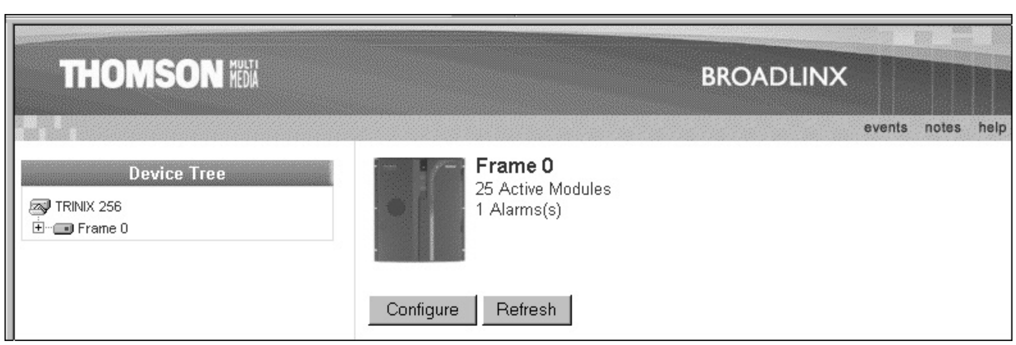
To check the Proxy setting, go to Tools > Internet Options > Connections > LAN Settings.

5. Enter the factory default URL (NR board IP address):

http://192.168.253.200

You should see the main Broadlinx web page:

Figure 92.



6. Proceed to *Software Installation* on page 166.

Complex Network

If the network includes additional PCs, connections to additional networks, etc., or if there is more than one Broadlinx board, then the factory default network settings of the board(s) will need to be adjusted to avoid conflicts.

1. Make the PC's network settings compatible with the Broadlinx board's default values:
   a. Set the PC's network TCP/IP address to 192.168.253.201 and the subnet mask to 255.255.255.0. All other TCP/IP network settings are irrelevant at this point.
   b. Reboot the PC to apply the changes.

      If desired, you can use the MS-DOS **`ipconfig`** command to verify the settings.

      These PC settings can be changed back to their previous values after the Broadlinx board has been configured.

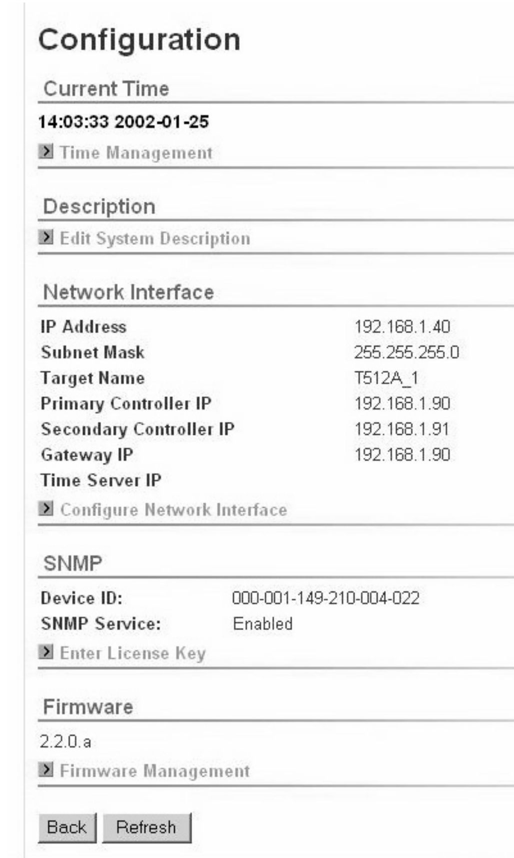
      You must have admin privileges to change Internet settings on a Windows 2000 PC.
2. If there is a secondary Broadlinx board installed, unseat the board.
3. The primary Broadlinx board should be booted (or rebooted) at this time. One way to do this is to unseat and reseat the board:
   a. To re-insert the board, keep the ejector levers spread apart and slide the board in until the levers make contact.Then fold the levers toward each other to seat the board.
   b. Wait for the board to boot up fully (as indicated by the “spinning” pattern of the LEDs on the front edge of the board).
4. At the PC, start Microsoft Internet Explorer.
5. The Explorer Proxy setting must be turned off.

   To check the Proxy setting, go to Tools > Internet Options > Connections > LAN Settings.
6. Enter the factory default URL (board IP address):

   http://192.168.253.200

   You should see the main Broadlinx web page (as shown on page 162).
7. Press the “Configure” button to navigate to the Configuration page (Figure 93). You should see the current Network Interface parameters. Your parameters will differ from those of the figure.

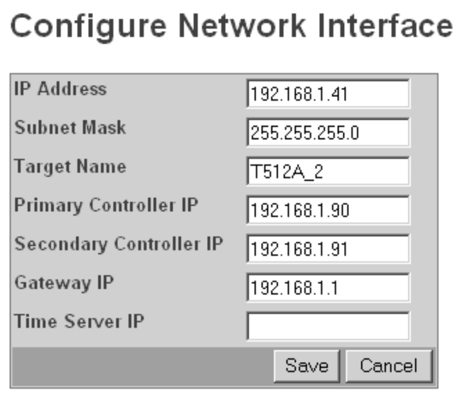
Figure 93.



8. Press the "Configure Network Interface" button (orange box with > in it) to navigate to the Network Configuration page. You will be prompted to enter a User Name and Password. Enter "admin" for the User Name, "admin" for the Password, and press the Log On button to continue.

9. The Configure Network Page (Figure 94) will be displayed:

Figure 94.



IP Address - this field assigns an IP address to the primary NR-33000.

Note This address must end with an even number. If an odd number is entered, it will automatically be changed to the next higher number. The secondary board will automatically be given the same IP address as the primary board, plus 1.

Subnet Mask - typically 255.255.255.0 (Class C net with no subnetting).

Target Name (SMS control only) - Name used by SMS 7000 control system for router. This name can be up to eight characters, but the last character must be a "1." (The Secondary NR will automatically be given the same name with "2" as the last character.)

Primary Controller IP (Encore control only) - Enter the address of the Master System Controller Board.

Secondary Controller IP (Encore redundant control only) - Enter the address of the Mirror System Controller Board.

Gateway IP - used only if the Trinix is connected to the Broadlinx PC through a gateway.

Time Server IP (optional, network time server address).

If you don't know what values to enter consult your network administrator. Your parameters will differ from those of the figure.

10. The **SNMP Device ID** is the MAC address of the NR-33000. Used when obtaining license for SNMP/NetCentral monitoring. For more information, see page 22.

11. If you change the Broadlinx board to another network you will lose the connection at this point.

12. If more than one Broadlinx board has been supplied for this frame, re-seat the secondary board at this time and wait for the board to boot up. Repeat the above procedure starting with Step 6 on page 163.

Software Installation

Broadlinx boards are shipped with all current Trinix software installed. For upgrade information, refer to the Field Engineering Bulletin supplied with the software.

SNMP/NetCentral Monitoring

For a brief description of SNMP/NetCentral monitoring, see page 22.

Broadlinx / Internet Explorer Monitoring

Normal Connection Procedure Following Network Address Configuration

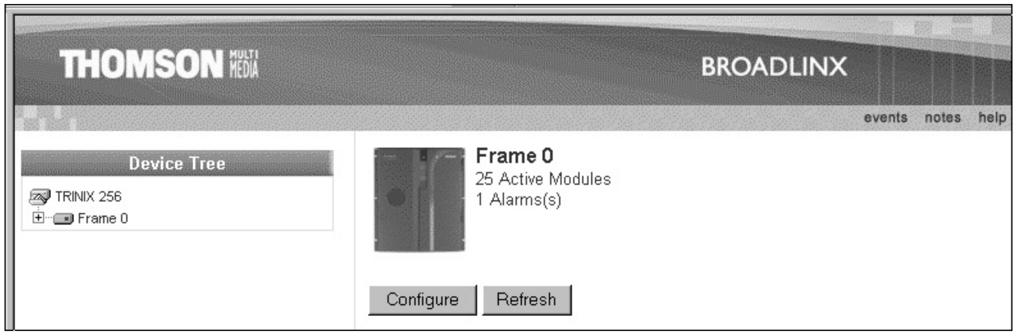
1. Launch Internet Explorer.

   The PC used in connection with Broadlinx monitoring requires Microsoft Internet Explorer 5.0 or newer; version 6 or newer is recommended for best performance.

2. Enter the URL for the Broadlinx board installed in the system to be monitored.

3. When connection is established, you will see the Broadlinx top-level web page (similar to the following):

Figure 95.



In this example, “Device Tree” is the System Description. This name can be modified if desired (as described on page 174). The list below the System Description can be expanded to show all system PC boards and modules available for Broadlinx communication.

The graphic of the router front panel shows the status of the master alarm (green or red dot).

For a discussion of Frame Numbers, see page 146.

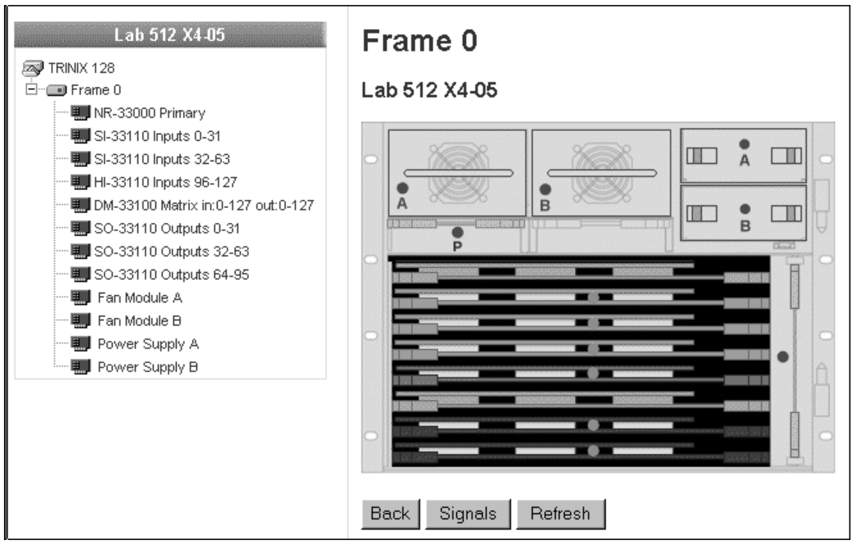
Note The Broadlinx displays do not update themselves automatically. Use the “Refresh” button in the Broadlinx window to update screens. You may be asked “Repost Form data?”; answer Yes.

To return to this page at any time, use the Internet Explorer “Refresh” button.

Checking Hardware Status

1. Connect to the router following the procedure just described.
2. Click on the graphic of the router front panel. A line drawing of the Trinix chassis will appear (similar to Figure 96).

Figure 96.



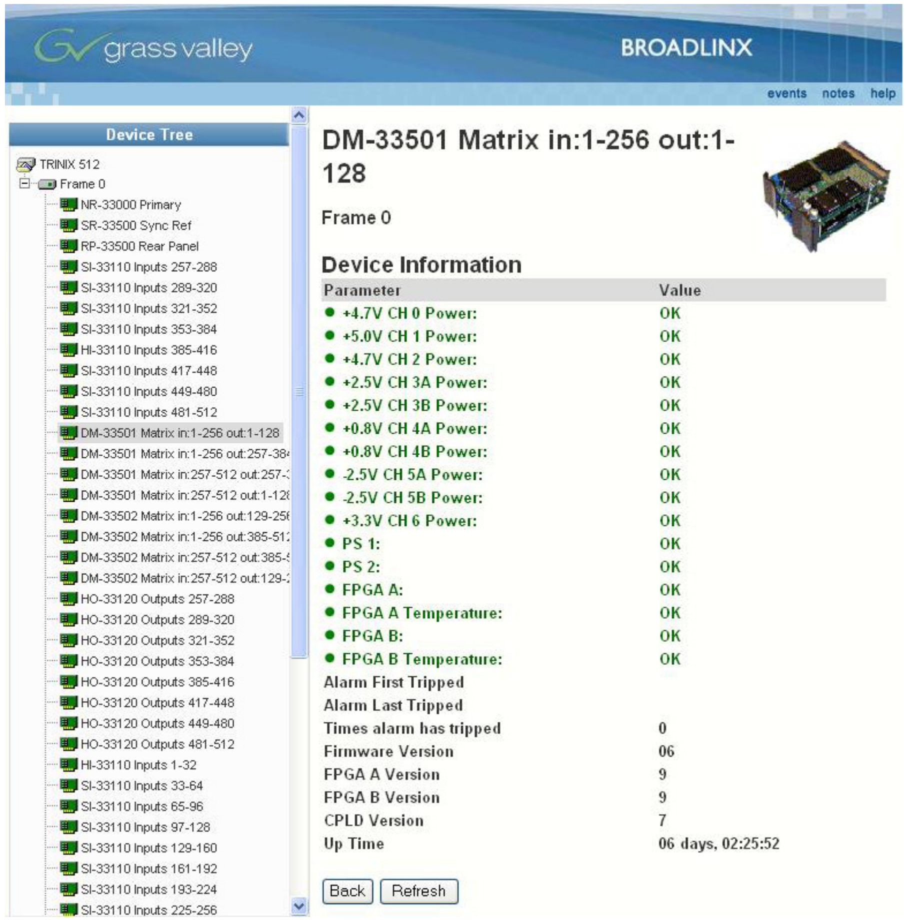
In this example, all modules and boards show a green dot meaning that operation is normal.

3. Click on a module or board to check its condition. See Figure 97.

   You can click either on the name in the list or on the graphic.

   For DV-33512 routers, the SR-33500 Sync Reference board and the RP-33500 Rear Panel must be selected from the list (because these boards on located on the rear panel).

Figure 97. Example of web page for specific board

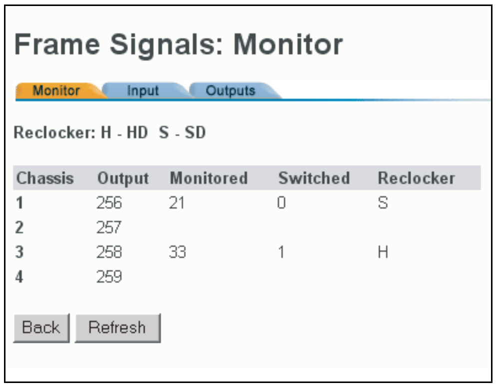


Checking Switcher Signal Status

1. Connect to the router following the procedure described on page 166.
2. Click on the graphic of the router front panel.
3. Select "Signals."

   A menu similar to Figure 98 will appear.

Figure 98. Monitor Window (DV-33128 and DV-33256).



The **Monitor** tab displays the following:

- "Chassis" - this column lists the monitor output ports labelled "1" through "4" on the back of the chassis.
- "Output"- numbers that are entered in the control system (e.g., Jupiter) to identify the Trinix monitor outputs. In this example, which shows a 256 x 256 router, the four monitor output numbers are 256, 257, 258, and 259 (in the Jupiter environment these are referred to as "physical" output numbers). These numbers correspond to monitor output ports labelled 1 through 4 on the rear of the chassis (as shown on page 139).
- "Monitored" - the number of the output that is being monitored by the control system. In this example, output 21 is being sent to monitor output port 2.
- "Switched" - the number of the input that is being switched to this monitor output.
- "Reclocker" (DV-33128 and DV-33256) - "H" = monitor output board is locked to (and is reclocking) an HD signal. "S" = monitor output board is not reclocking this signal (because the signal is either SD or Force Bypass mode is selected). For more information about output monitor reclocking see page 142.

- “Reclocker” (DV-33512) - “L” = monitor output board is locked to (and is reclocking) the signal. “B” = monitor output board is bypassing (and not reclocking) this signal For more information about output monitor reclocking, see page 142.

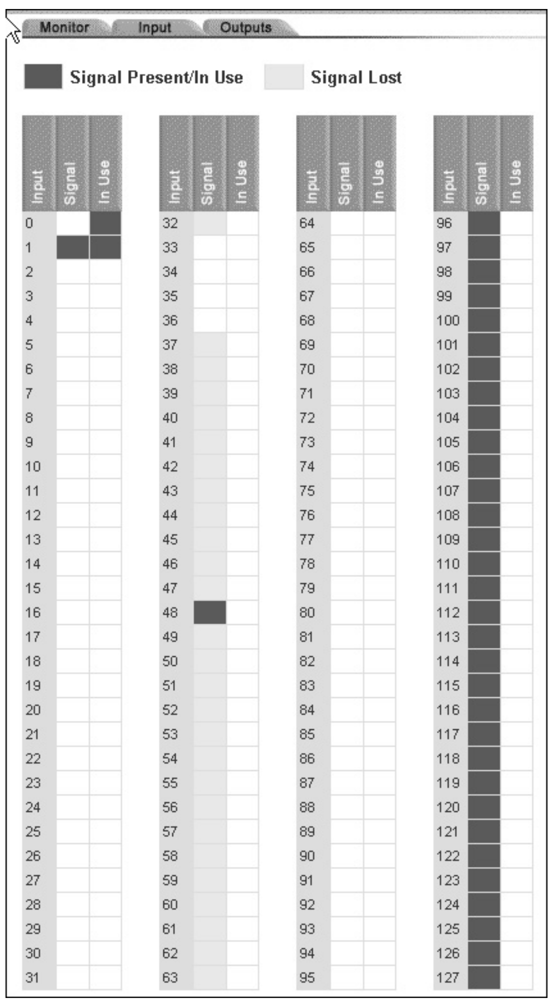
For more information about output monitoring, refer to the manual supplied with the control system.

Note The Monitor display has not been fully defined for expanded systems.

Selecting the **Input** tab will display a menu similar to that shown in Figure 99. This table shows the following for each input:

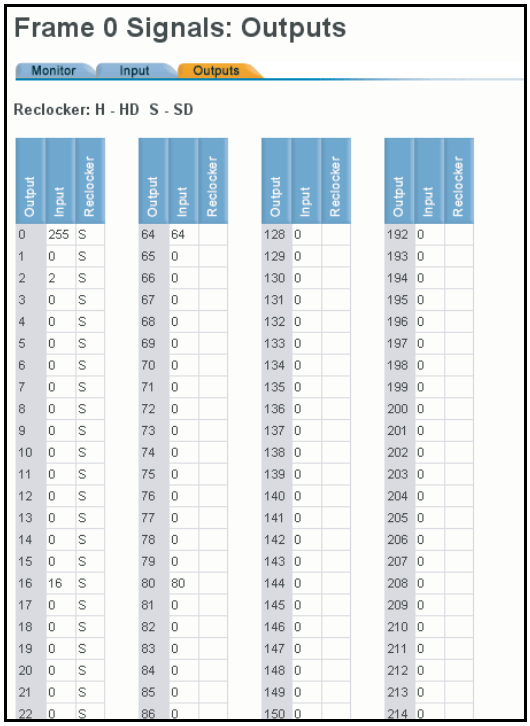
- Input signal presence (yes or no)
- Whether or not the input is in use (i.e., whether or not it is currently switched to an output).
- If a proper input signal was present but has since been lost

Figure 99.



Selecting the **Outputs tab** will display a menu similar to that shown in Figure 100. This table shows the status of each physical output (i.e., the number of the physical input switched to the output) and whether or not the reclocking circuit is enabled for the output. For more information about reclocking see page 129.

Figure 100.



Frame 0 Signals: Outputs

Monitor | Input | Outputs

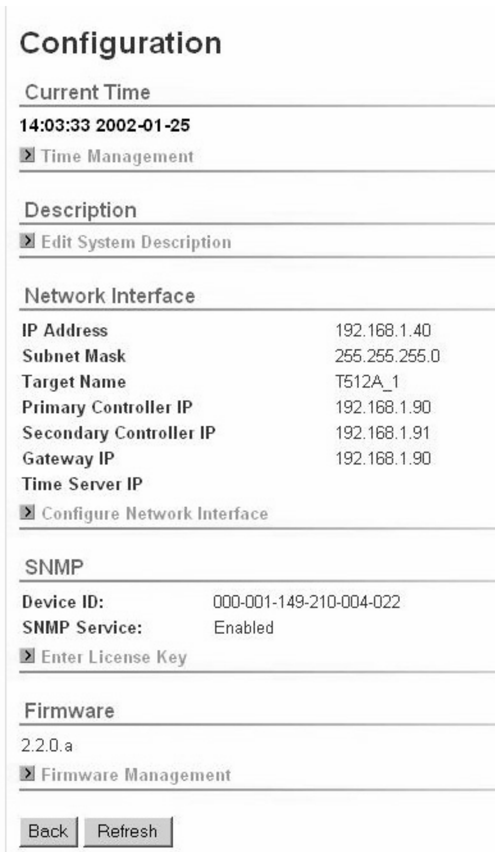
Reclocker: H - HD S - SD

Output	Input	Reclocker	Output	Input	Reclocker	Output	Input	Reclocker	Output	Input	Reclocker
0	255	S	64	64		128	0		192	0	
1	0	S	65	0		129	0		193	0	
2	2	S	66	0		130	0		194	0	
3	0	S	67	0		131	0		195	0	
4	0	S	68	0		132	0		196	0	
5	0	S	69	0		133	0		197	0	
6	0	S	70	0		134	0		198	0	
7	0	S	71	0		135	0		199	0	
8	0	S	72	0		136	0		200	0	
9	0	S	73	0		137	0		201	0	
10	0	S	74	0		138	0		202	0	
11	0	S	75	0		139	0		203	0	
12	0	S	76	0		140	0		204	0	
13	0	S	77	0		141	0		205	0	
14	0	S	78	0		142	0		206	0	
15	0	S	79	0		143	0		207	0	
16	16	S	80	80		144	0		208	0	
17	0	S	81	0		145	0		209	0	
18	0	S	82	0		146	0		210	0	
19	0	S	83	0		147	0		211	0	
20	0	S	84	0		148	0		212	0	
21	0	S	85	0		149	0		213	0	
22	0	S	86	0		150	0		214	0	

Configuration

1. Connect to the router following the procedure described on page 166.
2. Select “Configuration.” This will display a menu similar to that shown in Figure 101.

Figure 101.



The “Firmware” field shows the version number of the last-activated top-level software package. In most cases, this will be the version that is currently running in the system. However, if a PC board (such as an input board or output board) has been replaced, and the new board contains different firmware, then the version indicated here will no longer be accurate. For more information, see page 175.

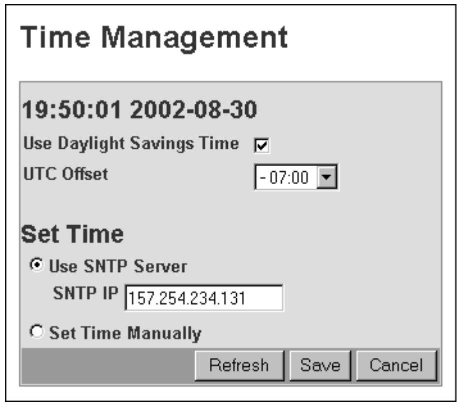
Opening any of these menus will require entry of the logon user name “admin” and password “admin.” (The present version of software does not allow changing the user name and password.)

Note More than one “admin” user can be logged on at the same time. There is no indication when this is the case.

Time Management

Broadlinx time settings are used only to timestamp the "Events" log entries. The menu is shown in Figure 102.

Figure 102.



This clock will synchronize automatically to a VITC signal on line 14[1] of the sync reference input.

The Daylight Savings Time box must be checked or unchecked manually at the appropriate time during the year.

The UTC Offset is the number of hours that standard time at the customer location is ahead or behind Universal Time Coordinated (Greenwich Mean Time). For example, for the U.S. Eastern time zone the entry would always be "-5:00."

If a SNTP (Simple Network Time Protocol) server will be used as a time source, select the SNTP radio button and enter the IP address of the server.

The SNTP address can also be changed on the Configure Net Interface menu. If the SNTP server is on another network you may need to enter the IP address of the gateway to that network (see page 175).

If no external reference is available, the clock will run in stand-alone mode. In this case, click the "Manual" button and enter the appropriate values.

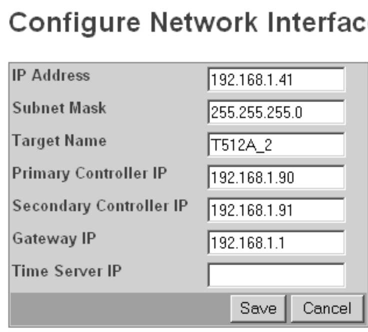
System Description

This is the source of the system name that appears on the left side of the top-level Broadlinx page (Figure 95 on page 167).

1. per SMPTE RP 164-1996.

Network Interface

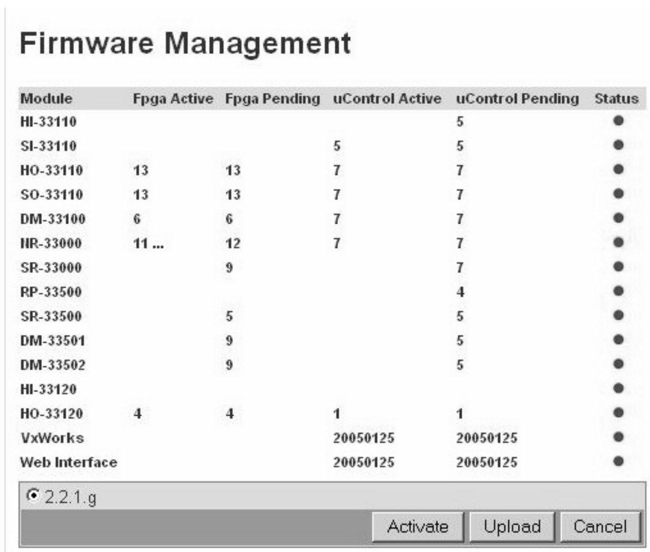
Figure 103.



Use of this menu has already been described (page 165).

Firmware Management

Figure 104.



Firmware Management

Module	Fpga Active	Fpga Pending	uControl Active	uControl Pending	Status
HI-33110				5	●
SI-33110			5	5	●
HO-33110	13	13	7	7	●
SO-33110	13	13	7	7	●
DM-33100	6	6	7	7	●
NR-33000	11 ...	12	7	7	●
SR-33000		9		7	●
RP-33500				4	●
SR-33500		5		5	●
DM-33501		9		5	●
DM-33502		9		5	●
HI-33120					●
HO-33120	4	4	1	1	●
VxWorks			20050125	20050125	●
Web Interface			20050125	20050125	●

2.2.1.g

Activate Upload Cancel

The firmware used in the Trinix system consists of a collection of programs operating within the various PC boards. These programs are identified either by a sub-level revision number from 1 to 255 or by a date. Since these programs must be compatible with each other, they are managed as a package with a top-level revision number.

The Firmware Management table displays the types of possible PC boards, the version of sub-level software that is presently associated with each type that is installed, the versions of top-level software packages present in the Broadlinx board, and the compatibility Status of these software elements.

Not all PC board types will always be present in a given system. The possible boards are as follows:

HI - High Definition Input board
SI - Standard Definition Input board
HO - High Definition Output board
SO - Standard Definition Output board
DM - Data Matrix board
NR - Broadlinx board (Sync/NIC/OPM board)
SR - Sync/OPM board
RP - interface board (used only on DV-33512 chassis)

Also listed on this menu:
VxWorks - operating system (used only on NR board)
Web Interface - software used to communicate with the PC (used only on NR board)

Each Trinix circuit board typically has a program active in one or more FPGA (Field Programmable Gate Array) ICs and another program active in a microcontroller IC. The FPGA controls the board's switcher functions, while the microcontroller allows Broadlinx communication to and from the FPGA and other board components.

In most cases there will be more than one PC board of a given type in the system (multiple output boards, for example). If there is a difference in FPGA or microcontroller firmware version from one board to the next, the version running on the first board will be shown and the fact that a difference exists will be indicated by three dots. For example, if there are four SO-33110 output boards, three with firmware version "2" and one with firmware version "1," the table will show "1..."

The Broadlinx board contains at least one, and usually two versions of the top-level software package used in the system. These two versions are kept in separate parts of the board's memory and listed along the bottom of the Firmware Management menu with the last-activated version shown first.

The radio buttons are used to select which top-level software package in the Broadlinx board is being compared to the sub-level programs currently running on the PC boards. The sub-level programs in the selected package are identified in the "FPGA Pending" column and the "uControl Pending" column. The system compares the version numbers of each sub-level software pair; if there is a mismatch the Status light will be red.

General Guidelines for Firmware Management

- There should be no red lights in the Status column. If there are, it may be that a board has been replaced by another with an older version of software. The solution is to check the radio button on the bottom of the menu that is next to the latest top-level software package, then update the software to the newest version. For more information, refer to the Field Engineering Bulletin supplied with the software or contact Grass Valley technical support.
- In most cases the latest software should be used. The two top-level software packages shown along the bottom of the menu should have the newest package listed first, indicating that the newest package was the last one activated.

CAUTION Grass Valley strongly recommends that users keep all software current. New boards are *not* guaranteed to be compatible with old versions of software. A system failure may occur if a new board is received as a replacement part and loaded with old software.

Firmware Update

For firmware update instructions, refer to the Field Engineering Bulletin supplied with the firmware.

On-line Help

If Adobe Acrobat Reader is installed on the PC, the Trinix manual can be displayed on line by clicking the “Help” command in the Broadlinx title bar. (The Help command may be beyond the right margin of the Broadlinx window; if so, go to the left edge of the window and slide it to the left until the Help command appears.)

Section 5

Protected Path Configuration

System Configuration

For an overview of the protected path function, see page 60.

Broadlinx Web Page

The signal monitoring and failover process is controlled and monitored by the Broadlinx software that is executing on the NR-33000 Sync/NIC/OPM board.

The system wiring discussed above must be described using the Broadlinx "Paths" table. This table is part of the "Signals" group of tables. Figure 105 shows an example system where ten protected paths have been identified.

The "Primary" column is generated by the system and will automatically show the maximum number of outputs that can be protected. This example applies to a DV-33512 router, so the maximum number of protected paths is 256. However, the outputs from 129 to 160 are shown as "Output N/A" because they are not being provided by an HO-33120 output board. Signal presence is indicated by a **green output number**; loss of signal is indicated by a **red output number**.

The "Secondary" column is used to enter the corresponding secondary output number for each protected pair.

If the Trinix is set for Encore control (rear panel switch set to "INT XPT CNTL" = closed), these columns will automatically be shown as 1-based. If the Trinix is set for Jupiter control ("INT XPT CNTL" = open), these columns will automatically be shown as zero-based.

The "Status" column shows a **green status flag** when the primary path is enabled. A **yellow status flag** indicates that an error has been detected in the primary path and the secondary path has been selected.

A **red status flag** indicates that an error has been detected in both the primary output signal and the secondary output signal.

A **gray status flag** indicates that the output has already been assigned as part of a protected path.

A **black status flag** means that the output is not available because an HO-33120 board is not present in that slot.

The "**-1**" indicator means that the output is available for protected path operation but has not been assigned a secondary path.

The "Toggle" column can be used to change from primary to secondary or secondary to primary. In this case the "Toggle" box is checked and the "Enter" button selected.

All protected paths can be changed together by checking either the "Primary" or "Secondary" check box and selecting "Enter."

Figure 105. Broadlinx web page for protected path configuration (example)

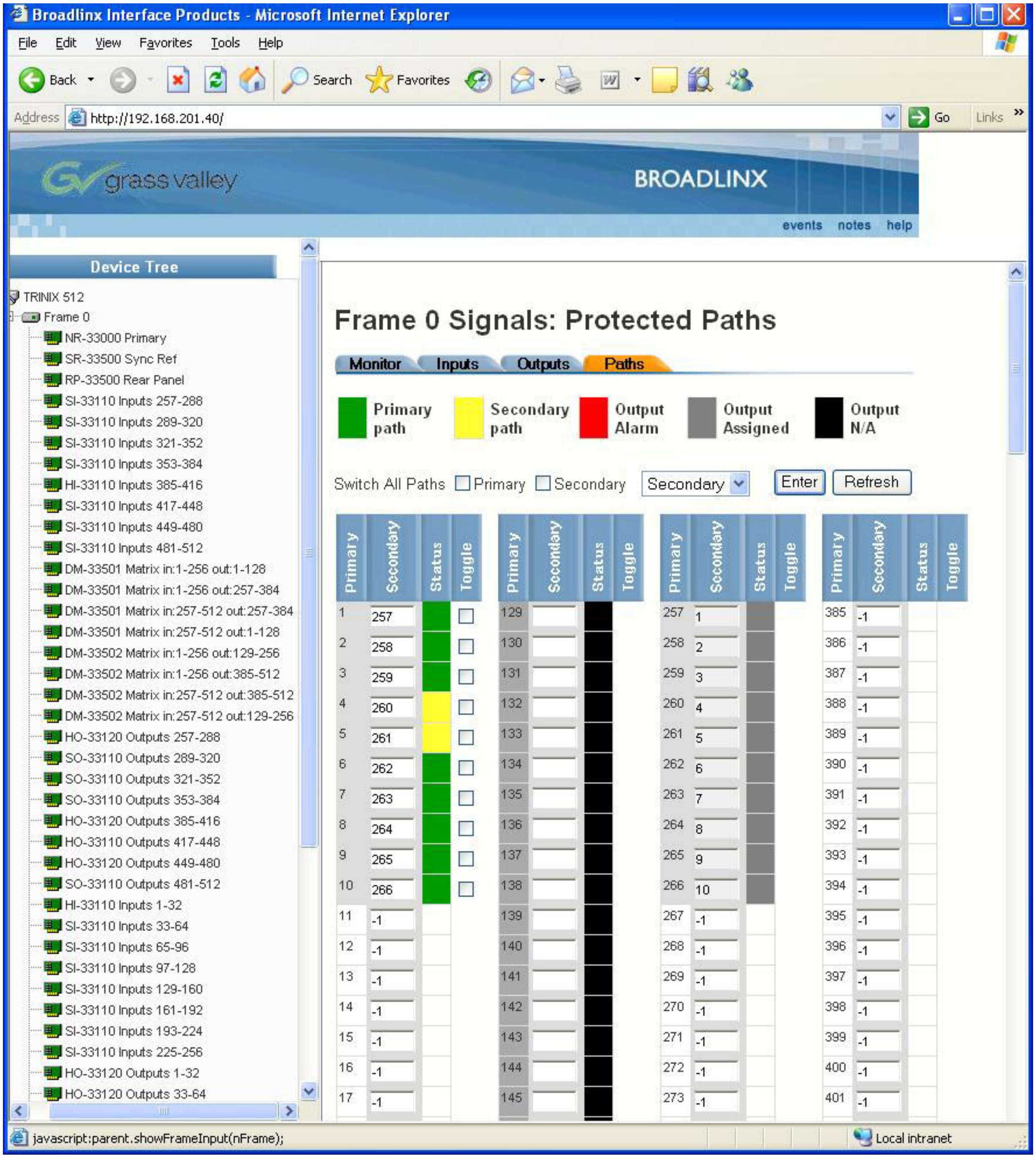


Figure 106. Command buttons on bottom of protected paths menu

Alarm Options Pull-down Menu

System Alarm Overview The Trinix system alarm is designed to monitor various router functions, including operation of fans, chassis power supplies, on-board power supplies, and primary vs. secondary Broadlinx board operation. The system alarm is connected to the LED on the front door of the router and the rear panel "Alarm" BNC connector. The system alarm has two modes: a "secondary" alarm mode, which illuminates the amber LED on the front door of the router; and a "primary" alarm mode, which illuminates the red LED on the door. A jumper on the Broadlinx board is normally set so that both alarm modes will also enable the rear-panel "Alarm" BNC connector. Additional information concerning the Trinix system alarm can be found in the Trinix manual.

Protected path alarms As described above, the protected path web page will indicate failure/changeover conditions using various colors and flags. The system alarm can also be triggered according to the selection made using the alarm pull-down box. Selections are as follows:

- No Alarms - protected path failure/changeover events will not trigger the system alarm. (Failure/changeover will still be indicated on the web page).
- Primary - failure/changeover on any primary path will trigger the system alarm.
- Secondary - failure/changeover on any secondary and primary path will trigger the system alarm.
- Any Alarm - failure/changeover on any protected path will trigger the system alarm. This is the default (and recommended) setting.

In the example shown in Figure 105, the two yellow flags indicate failures in two primary paths. Primary path output 4 has failed and the system is now using secondary path output 260 instead; and, primary path output 5 has failed and the system is now using secondary path output 261 instead. Because the alarm pull-down box is set to "secondary," the system alarm will **not** be triggered in this example. However if one or more secondary paths were to fail, then an **amber** LED would seen on the front door; if the jumper described above is in the default position, an alarm condition would also be present on the rear panel Alarm BNC connector.

Auto-fill Editing Tool

When entering output numbers, a range of outputs can be assigned with a single command. The range can be indicated with a “Start,Stop” entry or a “Start+n” entry.

For example, at the Primary “12” row, in the “Secondary” field, entering “258,260” would result in the following assignments:

Table 30.

Primary	Secondary
12	258
13	259
14	260

Entering “258+2” would have the same result.

The auto-fill tool will not overwrite existing assignments.

Command Buttons

These buttons are located on the bottom of the protected paths menu.

Remove All Paths

This un-assigns all primary and secondary path links.

CAUTION Pressing the “Remove All Paths” button clears the table immediately. There is no “Undo” for this command.

Add All Boards

The “Add All Boards” button will automatically assign the first half of the router’s inputs as primary outputs and the second half as secondary outputs. In other words, the entire router would be configured for protected path operation.

For example, using Add All Boards on a DV-33512 router would assign output 1 as the primary path output with output 257 as the associated secondary path output; output 2 as the primary path output with output 258 as the associated secondary path output, etc.

Back

Returns to the Signals page.

Enter

Applies output number(s) just entered.

Refresh

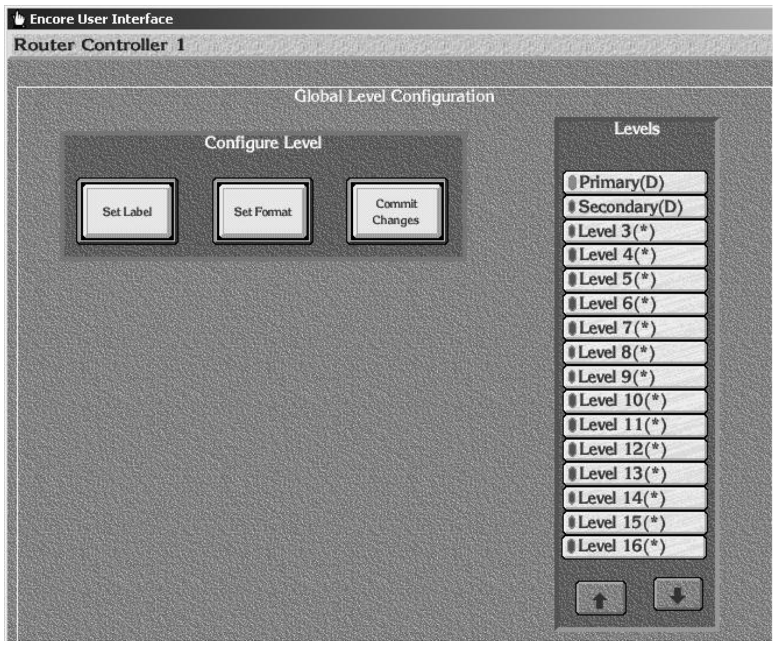
Checks router status and refreshes display.

Encore Configuration

When the router is controlled by Encore, protected path operation requires configuration as follows:

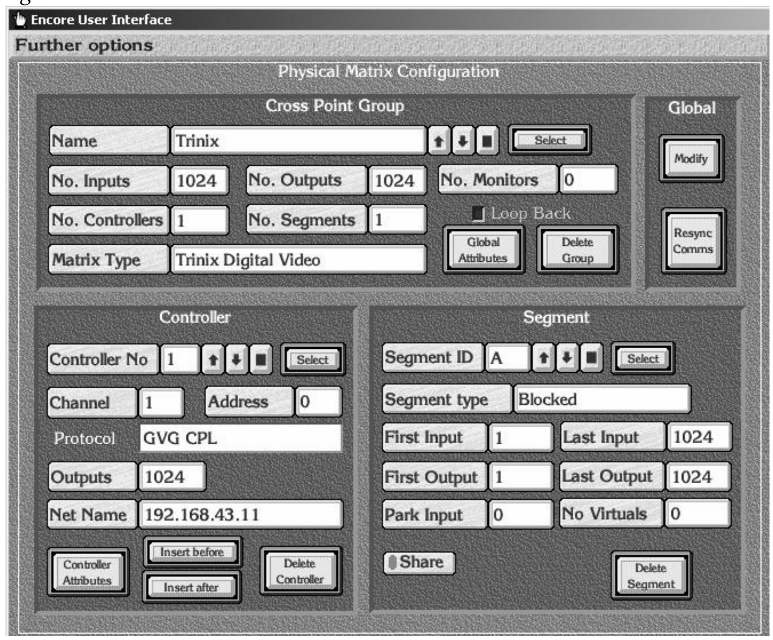
1. Create two levels (one for each of the primary and secondary paths):

Figure 107.



2. Create a Physical matrix for Trinix with a single, blocked segment:

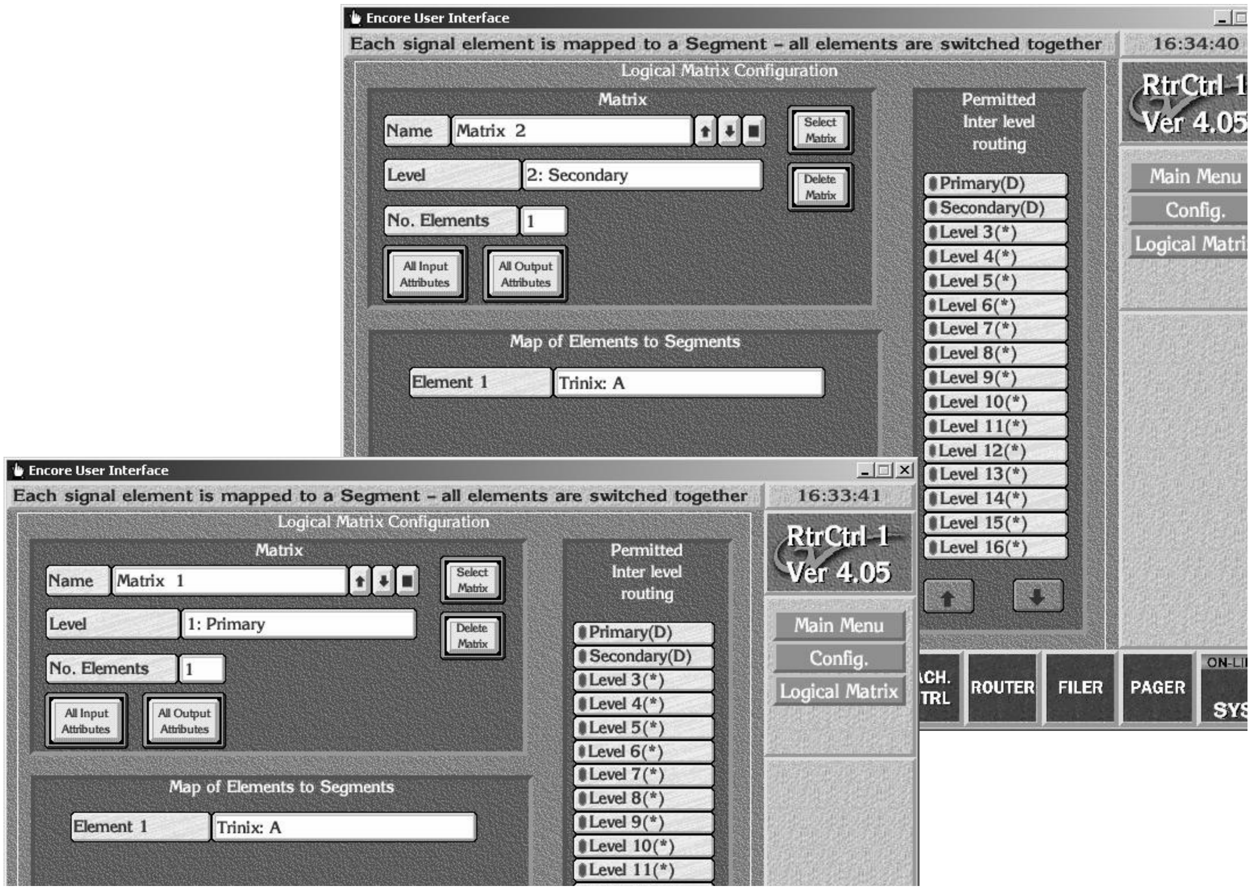
Figure 108.



3. Enable the Share option in the Segment configuration (this allows the segment to be shared across multiple logical matrices).

4. Create two logical matrices (one for each of the primary and secondary paths):

Figure 109.

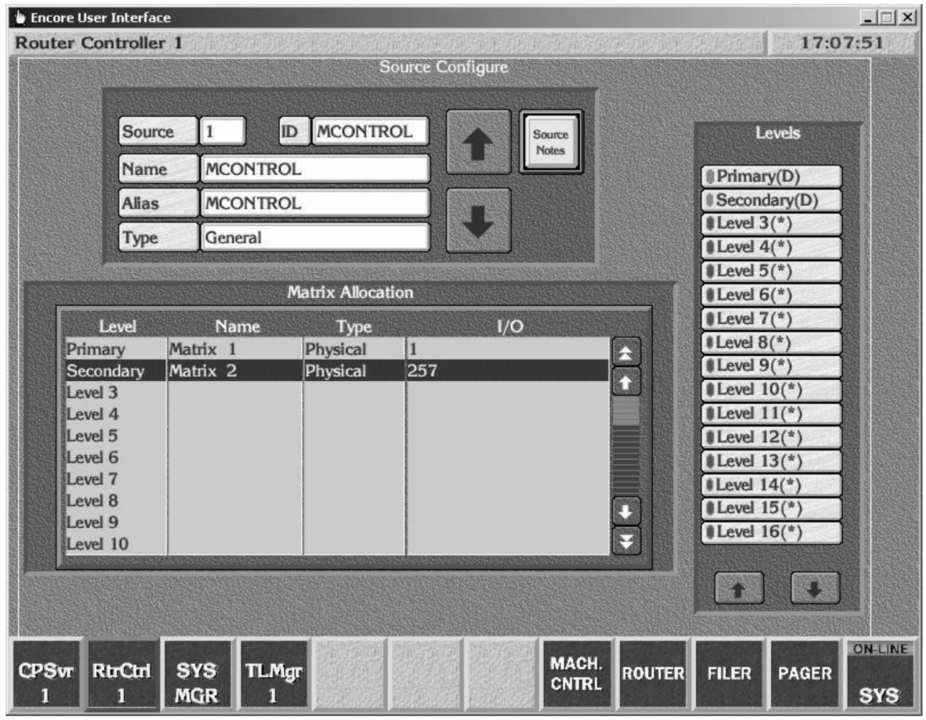


5. Assign one logical matrix to the primary level, assign primary logical matrix “Element 1” to be the Segment created in StepStep 2 above.

6. Assign the other logical matrix to the secondary level, assign secondary logical matrix “Element 1” to be the Segment created in Step Step 2.

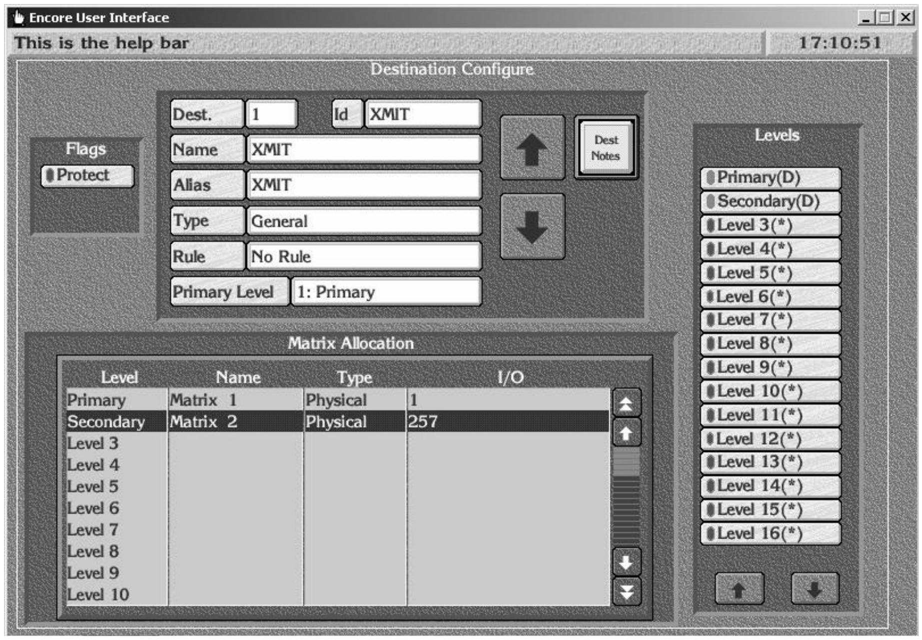
7. Using the Source Configure screen, select the desired source and enter the logical matrix names connector numbers for the primary and secondary levels on the selected source:

Figure 110.



8. Using the Destination Configure screen, select the desired destination and enter the logical matrix names and connector numbers for the primary and secondary levels on the selected destination:

Figure 111.



Note With Encore systems, there is no “follow” level locking function, i.e., it remains possible to inadvertently perform a breakaway switch.

Jupiter Configuration

As described earlier, the control system (e.g. Encore or Jupiter) must be operated so that the secondary path is always ready to provide a copy of the protected signal.

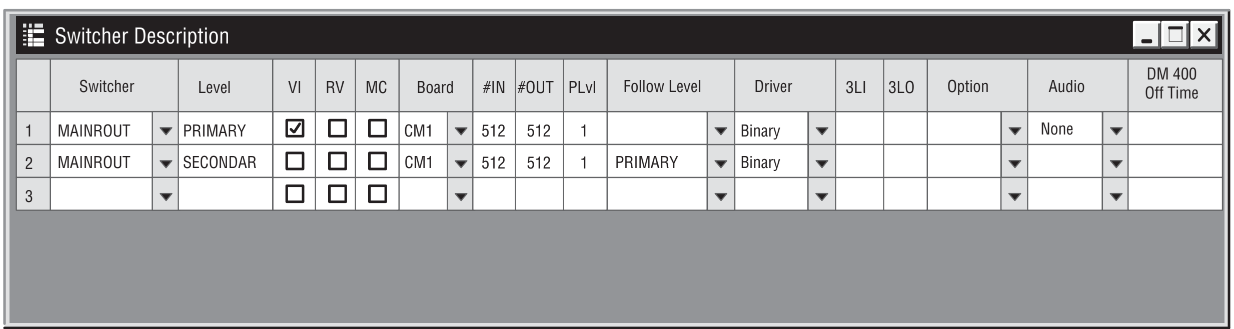
To simplify operation, a Jupiter control system should be configured so that the secondary path will be switched automatically, i.e., “follow” the primary path switch. This can be arranged using “logical level mapping,” where the primary paths are assigned to one logical level and the secondary paths to another logical level, but both logical levels are assigned to the same physical level. Special Switch Input and Switcher Output tables are then created for each of these levels.

For example, the station engineer may want to set aside a 32 x 32 block of a DV-33512 router for secondary path operation. This block would consist of a dedicated input board with inputs 257-288, and a dedicated HO-33120 output board with outputs 257-288.

Switcher Description Table

In the Jupiter Switcher Description table, a 480 x 480 block would be assigned to the “Primary” logical level, and assigned to physical level “1.” See Figure 112.

Figure 112.


Switcher Description

	Switcher	Level	VI	RV	MC	Board	#IN	#OUT	PLvl	Follow Level	Driver	3LI	3LO	Option	Audio	DM 400 Off Time
1	MAINROUT	PRIMARY	☑	☐	☐	CM1	512	512	1		Binary				None	
2	MAINROUT	SECONDAR	☐	☐	☐	CM1	512	512	1	PRIMARY	Binary					
3			☐	☐	☐											

The remaining 32 x 32 block would be defined as the “Secondary” logical level and also assigned to physical level “1.”

The “Follow” field for the Secondary level would list the name of the primary logical level. This will prohibit breakaway switching.

Note The “#IN / #OUT” shown in the Switcher Description table is the overall system size, i.e., in this example the entry would be 512 x 512 for both logical levels.

Switcher Input Tables

With two logical levels defined on the Switcher Description table, the Switcher Input and Switcher Output tables will automatically show a column for each level.

In order to perform two-level switching, Switcher Input tables and Switcher Output tables are used to describe the primary and secondary paths.

Figure 113.

Switcher Input - MAINROUT

	Logical Input Name	PRIMARY	SECONDAR
1	MCONTROL	001	257
2	VT01	002	258
3	VT02	003	259
4	VT03	004	260
	⋮		
32	AUX4	032	288
33	AUX5	033	
34	AUX5	034	
	⋮		
256	CH25	256	
257	CH26	289	
258	CH27	290	
	⋮		
480	BARS	512	

Switcher Output - MAINROUT

	Logical Ouput Name	Security	S-T	Pass word	PRIMARY	SECONDAR
1	XMIT		-		001	257
2	VT01		-		002	258
3	VT02		-		003	259
4	VT03		-		004	260
	⋮					
32	AUX4		-		032	288
33	AUX5		-		033	
34	AUX5		-		034	
	⋮					
256	SAT13		-		256	
257	SAT14		-		289	
258	SAT15		-		290	
	⋮					
480	MAT MON		-		512	

In this example, the Switcher Input table for the Primary level would list 480 inputs: 001 through 256 and 289 through 512. The Secondary level would list 32 inputs: 257 through 288.

The same logic would apply to Switcher Output tables.

In this configuration, selecting “XMIT” as an output and “MCONTROL” as an input will cause two switches to be made.

Finally, CP Input and CP Output Set tables would be used to tie Category/Number selections to the logical names of the desired inputs and outputs on both levels.

For more information about logical level mapping, refer to the Jupiter Installation and Operating manual.

Operation Notes

Jupiter Systems

CAUTION For Jupiter-controlled routers, replacing an HO-33120 output board that is part of a protected path scheme will cause a momentary loss of video on the **active** output. In other words, **video will be lost on the board not being replaced.** This interruption will continue for several seconds. Maintenance personnel should therefore plan on such replacement only when the protected output is not being used on air.

Section 6

Analog Input Processing

TRX-VI-33100 Module

The TRX-VI-33100 video input module consists of a 16-input “universal” base board (VI-33100) and a 16-input digital-only mezzanine board (HI-33201).

The VI-33100 universal base board auto-senses and accepts 16 composite analog SD, digital SD, or digital HD signals in any combination and passes them in digital SD or digital HD form (as appropriate) to the Trinix matrix board. When analog signals are received, an extensive set of gain, phase, filtering, and other adjustments are available for each signal. These adjustments are summarized below.

Analog Processing Control

Adjustments for analog signals connected to the VI-33100 base board include the following:.

- Save/recall settings
- Mono mode
- Setup on/off
- Chroma kill
- Comb/trap filter
- AGC on/off
- Manual gain control
- ACC on/off
- Manual chroma control
- Insert Error Detection and Handling (EDH) data
- Contrast / Y gain
- Saturation / chroma gain
- Brightness / Y offset
- Hue / chroma phase
- Notch decode on/off (VBI)
- Chroma kill (VBI)
- Blank video (per VBI line)
- Add setup (per VBI line)
- Reserve VBI line for data
- Horizontal timing
- Detail enhancement
- Display channel status

Customizing Analog Video Processing Settings

When analog video signals are fed to the VI-33100 base board, each of the 16 inputs can be adjusted independently. The adjustments are made using a terminal connection to the board.

Terminal Setup

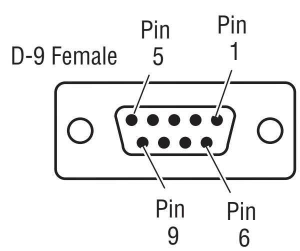
1. Connect a straight-through RS-232 serial cable from the VI-33100 card front-edge 9-pin connector to the serial port of a PC with Hyper terminal 6.3 software (or equivalent).

   One alternative to Hyper terminal is Tera Term 3.1.3 (freeware), which can be set to a 160- column display. This allows a wide display mode that will show the settings for all 16 inputs at once.

   The location of the D connector is shown on page 133. Pinouts are shown in Table 31.

CAUTION The Trinix system should not be operated with the front door open for extended periods. Therefore the configuration cable should be disconnected from the VI-33100 board when not in use and the door closed.

Table 31. VI-33100 card-edge connector pinouts.

Shielded 9-Pin D; socket contacts	Pin	
	1	
	2	TX
	3	RX
	4	
	5	Logic GND
	6	
	7	
	8	
	9	
	Shield	

2. Launch the terminal application (e.g., Hyper terminal) on the PC.
3. Set the terminal protocol to 115200 baud, 8 data bits, 1 stop bit, no parity bit, no flow control.

   A terminal window and a blinking cursor should appear.
4. Press ENTER.

   You should see the main menu:

Figure 114.

```
======= MAIN  Menu Options =======

1.) Setup Composite Video.
2.) Setup Video Processing.
3.) Setup Vertical Blanking.
4.) Setup Timing.
5.) Setup Picture Enhancer.
6.) Display Channel status.
7.) Save or Recall a Configuration File.
Select a menu option:
```

5. At this point you may want to change the display settings to get as many rows and columns, and as small a font, as practical.

For example, with Hyper terminal go to View > Font > and select a 6-point font. Then go to File > Properties > Settings > Emulation > ANSI > Terminal Setup and select 50 rows x 132 columns.

General notes about the setup application editor

Here are a few conventions about the setup application editor that may be helpful to know:

- Tables are edited using keyboard shortcut keys (not the mouse or cursor keys). The applicable shortcuts are listed on the bottom of the display.
- The first step is usually selection of one of the 16 inputs (channels).
- Channel numbers are hex-based. E.g., channel "a" on this table is labelled as input "11" on the rear panel of the router. A table of equivalent channel numbers is shown in Table 32.)
- For entries where ON or OFF is selected, 0 = OFF and 1 = ON.

Table 32. Channel number equivalents.

Input number as labelled on router rear panel	Corresponding input number as shown on table
1	0
2	1
3	2
4	3
5	4
6	5
7	6
8	7
9	8
10	9
11	a
12	b
13	c
14	d
15	e
16	f

Main Menu Options

This section assumes that the Terminal Setup procedure has been performed.

1.) Setup Composite Video

Composite video selections are summarized in Table 33.

These adjustments are made in the composite video path (before decoding to component digital format) and apply to all lines (active picture and VBI)

The actual menus are shown on page 199.

Table 33. Composite video selections.

Processing Function Type	Default	Range/Choices Resolution
Monochrome Input	0	Set to “0” for color input signal. May be set to “1” when a monochrome input signal is the source; this mode turns off luminance notch filters and chroma output.
Remove setup from video	1	Set to ”0” when no setup is present (Japanese NTSC) Set to “1” when setup is present (US NTSC).
Chroma Kill	0	Set to “0” for color signal. Set to “1” to turn off chroma difference signals (but leave luminance notch filter on).
Video Decode Mode	2	1 = No filter 2 = Comb filter 3 = Trap filter 1.20 4 = Trap filter 0.87 5 = Trap filter 0.72 6 = Trap filter 0.50
Video Input AGC (before digitizing)	1	Set to “0” to enable manual video gain control. Set to “1” for Automatic Gain Control. Operation is based on sync tip and peak video.
Input Video Gain	100.0	50.0–200% (0.5% steps). 100% = 1 V p-p.
Enable ACC	1	Set to “0” to enable manual chroma gain control Set to “1” for Automatic Chroma Control
Input Chroma Gain	100.0	50.0–200% (0.5% steps)

Figure 115. Setup composite video menu for NTSC, showing setup for all 16 inputs. PAL display is similar. (Only Input 0 is connected in this example.)

```
Video Composite In -
--------------------------------------------------------------------------------
Reference - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
================================================================================
Disable (Off) 0   Video Decode Mode:       Input Video Gain:
Enable  (On)  1    No filter           1    50.0 to 200.0% (0.5% steps)
                   Comb filter         2
                   Trap filter 1.20    3
                   Trap filter 0.87    4
                   Trap filter 0.72    5
                   Trap filter 0.50    6
--------------------------------------------------------------------------------
+-------------------------------------- Channel             Line Rate -------+
|                                                                            |
|   +---------------------------------- Monochrome Input (On/Off)            |
|   |   +------------------------------ Remove Setup from Video (On/Off)     |
|   |   |   +-------------------------- Chroma Kill (On/Off)                 |
|   |   |   |   +---------------------- Video Decode Mode                    |
|   |   |   |   |   +------------------ Enable AGC (On/Off)                  |
|   |   |   |   |   |   +-------------- Input Video Gain (%)                 |
|   |   |   |   |   |   |       +------ Enable ACC (On/Off)                  |
|   |   |   |   |   |   |       |                                            |
+---+---+---+---+---+---+-------+--------------------------------------------+--
0,  0,  0,  0,  2,  1,  100.0,  1                                            525
1,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
2,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
3,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
4,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
5,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
6,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
7,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
8,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
9,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
a,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
b,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
c,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
d,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
e,  0,  0,  0,  2,  1,  100.0,  1                                            N/A
f,  0,  0,  0,  2,  1,  100.0,  1                                            N/A

Press: '0 ~ 9' or 'A ~ F' to select channel to edit.
Press: 'M' to move/copy channel configuration.
Press: 'Z' to set ALL channels to factory defaults.
Press 'ESC' to return to Main Menu.
```

When an input (channel) is selected, the display will show the values for that particular channel. For example, selecting "0" will display the values for channel 0:

Figure 116. Composite video setup menu for one channel (NTSC shown).

```
Video Composite In -
--------------------------------------------------------------------------------
Reference - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
================================================================================
Selected  - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
--------------------------------------------------------------------------------
Disable (Off) 0   Video Decode Mode:       Input Video Gain:
Enable  (On)  1    No filter           1    50.0 to 200.0% (0.5% steps)
                   Comb filter         2
                   Trap filter 1.20    3
                   Trap filter 0.87    4
                   Trap filter 0.72    5
                   Trap filter 0.50    6
--------------------------------------------------------------------------------
+-------------------------------------- Channel             Line Rate -------+
|                                                                            |
|   +---------------------------------- Monochrome Input (On/Off)            |
|   |   +------------------------------ Remove Setup from Video (On/Off)     |
|   |   |   +-------------------------- Chroma Kill (On/Off)                 |
|   |   |   |   +---------------------- Video Decode Mode                    |
|   |   |   |   |   +------------------ Enable AGC (On/Off)                  |
|   |   |   |   |   |   +-------------- Input Video Gain (%)                 |
|   |   |   |   |   |   |       +------ Enable ACC (On/Off)                  |
|   |   |   |   |   |   |       |                                            |
+---+---+---+---+---+---+-------+--------------------------------------------+--
0,  0,  0,  0,  2,  1,  100.0,  1                                            525

To Disable/Enable Monochrome Only Input; press:  'Q'.
To Remove/Insert Setup from Video; press:        'E'.
To Enable/Disable Chroma Kill; press:            'R'.
To Set Video Decode Mode; press:                 'T'.
To Disable/Enable AGC; press:                    'D'.
To Decrement/Increment Input Video Gain; press:  'F'/'G'.
To Disable/Enable ACC; press:                    'C'.

Press: 'ESC' to ABORT changes and return to the previous Menu.
Press: 'Enter' to ACCEPT changes and select a different channel.
Press: 'Y' to revert back to last settings.
Press: 'Z' to set THIS channel to factory defaults.
```

2.) Setup Video Processing

These adjustments are made in the video path and apply to all lines (active picture and VBI)

Video processing selections are summarized in Table 34.

The actual menus are shown on page 201.

Table 34. Video processing selections

Processing Function Type	Default	Range/Choices Resolution
Insert EDH	0	1 = Allows EDH to be inserted
Contrast / Y Gain	100%	50–200% (0.5% steps)
Saturation / Chroma Gain	100%	50–200% (0.5% steps)
Brightness / Y Offset	0 Mv	±400 mV (3 mV steps)
Hue / Chroma Phase	0 degrees	±180 degrees (1.4 degree steps)

Figure 117. Video processing menu for NTSC, showing setup for all 16 inputs. PAL display is similar. (Only Input 0 is connected in this example.)

```
Video Processor -
--------------------------------------------------------------------------------
Reference - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
================================================================================
Disable (Off) 0
Enable  (On)  1

Contrast/Y Gain:                          Brightness/Y Offset:
  50.0% to 200.0% (0.5% steps)              -100.1 to +100.1Deg (0.7mV steps)
Saturation/Chroma Gain:                   Hue/Chroma Phase:
  50.0% to 200.0% (0.5% steps)              -180.0 to +180.0Deg (1.0Deg steps)
--------------------------------------------------------------------------------
+-------------------------------------------  Channel      Line Rate --------+
|                                                                             |
|   +-----------------------------------  Insert EDH (On/Off)                 |
|   |   +-------------------------------  Contrast / Y Gain (%)               |
|   |   |        +----------------------  Saturation / Chroma Gain (%)        |
|   |   |        |       +--------------  Brightness / Y Offset (mV)          |
|   |   |        |       |        +------  Hue / Chroma Phase (Deg)           |
+---+---+--------+-------+--------+-------------------------------------------+--
0,  0,  100.0,  100.0,  +000.0,  +000.0                                       525
1,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
2,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
3,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
4,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
5,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
6,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
7,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
8,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
9,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
a,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
b,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
c,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
d,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
e,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A
f,  0,  100.0,  100.0,  +000.0,  +000.0                                       N/A

Press: '0 ~ 9' or 'A ~ F' to select channel to edit.
Press: 'M' to move/copy channel configuration.
Press: 'Z' to set ALL channels to factory defaults.
Press 'ESC' to return to Main Menu.
```

When an input (channel) is selected, the display will show the values for that particular channel:

Figure 118. Video processing setup menu for one channel (NTSC shown).

```
Video Processor -
--------------------------------------------------------------------------------
Reference - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
================================================================================
Selected  - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
--------------------------------------------------------------------------------
Disable (Off) 0
Enable  (On)  1

Contrast/Y Gain:                          Brightness/Y Offset:
  50.0% to 200.0% (0.5% steps)              -100.1 to +100.1Deg (0.7mV steps)
Saturation/Chroma Gain:                   Hue/Chroma Phase:
  50.0% to 200.0% (0.5% steps)              -180.0 to +180.0Deg (1.0Deg steps)
--------------------------------------------------------------------------------
+-------------------------------------------  Channel      Line Rate --------+
|                                                                             |
|   +-----------------------------------  Insert EDH (On/Off)                 |
|   |   +-------------------------------  Contrast / Y Gain (%)               |
|   |   |        +----------------------  Saturation / Chroma Gain (%)        |
|   |   |        |       +--------------  Brightness / Y Offset (mV)          |
|   |   |        |       |        +------  Hue / Chroma Phase (Deg)           |
+---+---+--------+-------+--------+-------------------------------------------+--
0,  0,  100.0,  100.0,  +000.0,  +000.0                                       525

To Disable/Enable Insert EDH press:                       'W'.
To Decrement/Increment Contrast/Y Gain press:             'F'/'G'.
To Decrement/Increment Saturation/Chroma Gain press:      'V'/'B'.
To Decrement/Increment Brightness/Y Offset press:         'H'/'J'.
To Decrement/Increment Hue/Chroma Phase press:            'N'/'M'.

Press: 'ESC' to ABORT changes and return to the previous Menu.
Press: 'Enter' to ACCEPT changes and select a different channel.
Press: 'Y' to revert back to last settings.
Press: 'Z' to set THIS channel to factory defaults.
```

3.) Setup Vertical Blanking

The Notch Decode Mode and the Chroma Kill selections apply to all lines in the VBI.

Each line pair in the VBI can be set to pass or blank the incoming signal. In NTSC systems, each of these line pairs can also be set to add Setup if desired.

The number of line pairs that can carry data can be extended if desired. For example:

- In NTSC line pairs 10/273 through line pairs 20/283 are normally available for data. By using this menu, up to four additional line pairs can be reserved for data use.
- In PAL systems, up to five additional line pairs can be reserved.

Vertical blanking selections are summarized in Table 35.

The actual menus are shown on page 203.

Table 35. Vertical blanking selections.

<table>
<tr><th>Processing
Function
Type</th><th>Default</th><th>Range/Choices
Resolution</th></tr>
<tr><td>Notch Decode Mode</td><td>1</td><td rowspan="2">With Notch Decode set to “1” and Chroma Kill set to “0,” chroma is passed.
With Notch Decode set to “2” and Chroma Kill set to “1,” chroma is blanked and luminance is passed.</td></tr>
<tr><td>Chroma Kill</td><td>0</td></tr>
<tr><td>Blank Setup</td><td>0</td><td>0 = Pass this line pair as is
1 = Blank this line pair
2 = (NTSC only) Add Setup to this line pair
3 = (NTSC) Add Setup and blank this line pair</td></tr>
<tr><td>Reserve Line for Data Mode</td><td>0</td><td>NTSC-Reserve additional lines for data:
0 = No additional lines reserved
1 = Reserve lines 21 and 284
2 = Reserve lines 22 and 285
3 = Reserve lines 23 and 286
4 = Reserve lines 24 and 287

PALx-Reserve additional lines for data:
0 = No additional lines reserved
1 = Reserve lines 24 and 337
2 = Reserve lines 25 and 338
3 = Reserve lines 26 and 339
4 = Reserve lines 27 and 340
5 = Reserve lines 28 and 341</td></tr>
</table>

Figure 119. Vertical blanking interval menu for NTSC, showing setup for all 16 inputs. PAL display is similar. (Only Input 0 is connected in this example.).

```
Vertical Blanking Interval (VBI) -
--------------------------------------------------------------------------------
Reference - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
================================================================================
Disable (Off)  0              NTSC-Reserve Data:          VBI:
Enable  (On)   1                None     0                  None             0
                                21/284   1                  Blank Line Only  1
Notch Decode:                   22/285   2                  Add Setup Only   2
 Notch Decode  1                23/286   3                  Setup & Blank    3
 Pass Through  2                24/287   4

--------------------------------------------------------------------------------
+------------- Channel                                        Line Rate --------+
| +----------- Notch Decode Mode                                                |
| | +--------- Chroma Kill (On/Off)                                             |
| | | +------- Reserve Line for Data Mode                                       |
| | | |                                                                         |
| | | |                   |<-------- VBI Line Pairs ------>|<- Data  ->|        |
| | | |                   |                                |           |        |
| | | |                   |E  F  G  H  I  J  K  L  M  N  O |P  Q  R  S |        |
| | | |                   |10 11 12 13 14 15 16 17 18 19 20|21 22 23 24|        |
+-+-+-+-------------------+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--------+--
0,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     525
1,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
2,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
3,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
4,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
5,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
6,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
7,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
8,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
9,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
a,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
b,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
c,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
d,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
e,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A
f,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     N/A

Press: '0 ~ 9' or 'A ~ F' to select channel to edit.
Press: 'M' to move/copy channel configuration.
Press: 'Z' to set ALL channels to factory defaults.
Press 'ESC' to return to Main Menu.
```

When an input (channel) is selected, the display will show the values for that particular channel:

Figure 120. Vertical blanking interval setup menu for one channel (NTSC shown).

```
Vertical Blanking Interval (VBI) -
--------------------------------------------------------------------------------
Reference - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
================================================================================
Selected  - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
--------------------------------------------------------------------------------
Disable (Off)  0              NTSC-Reserve Data:          VBI:
Enable  (On)   1                None     0                  None             0
                                21/284   1                  Blank Line Only  1
Notch Decode:                   22/285   2                  Add Setup Only   2
 Notch Decode  1                23/286   3                  Setup & Blank    3
 Pass Through  2                24/287   4

--------------------------------------------------------------------------------
+------------- Channel                                        Line Rate --------+
| +----------- Notch Decode Mode                                                |
| | +--------- Chroma Kill (On/Off)                                             |
| | | +------- Reserve Line for Data Mode                                       |
| | | |                                                                         |
| | | |                   |<-------- VBI Line Pairs ------>|<- Data  ->|        |
| | | |                   |                                |           |        |
| | | |                   |E  F  G  H  I  J  K  L  M  N  O |P  Q  R  S |        |
| | | |                   |10 11 12 13 14 15 16 17 18 19 20|21 22 23 24|        |
+-+-+-+-------------------+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--------+--
0,1,0,0,                   0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0                     525

To Set Notch Decode Mode Press:                   '['.
To Disable/Enable Chroma Kill Mode press:         ']'.
To Set Reserve for Data Mode Press:               '\'.
To Set VBI Pair Data Press:                       'A' thru 'W'.

Press: 'ESC' to ABORT changes and return to the previous Menu.
Press: 'Enter' to ACCEPT changes and select a different channel.
Press: 'Y' to revert back to last settings.
Press: 'Z' to set THIS channel to factory defaults.
```

4.) Setup Timing

The following adjustments are made after conversion to digital format and apply to all lines (active picture and VBI).

Vertical blanking selections are summarized in Table 36.

The actual menus are shown on page 205.

Table 36. Timing selections.

Processing Function Type	Default	Range/Choices Resolution
Horizontal Timing	000.0	525 signal: 0.0 - 857.5 pixels (0.5 steps) 625 signal: 0.0 - 863.5 pixels (0.5 steps)

Figure 121. Summary of timing setup for NTSC, showing setup for all 16 inputs. PAL display is similar. (Only Input 0 is connected in this example.)..

```
Timing -
--------------------------------------------------------------------------------
Reference - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
================================================================================
Horizontal Timing:
 0.0 to 857.5 pixels (0.5 steps) for 525
 0.0 to 863.5 pixels (0.5 steps) for 625
--------------------------------------------------------------------------------
+---------------------------  Channel                    Line Rate ----------+
|                                                                            |
|       +--------------------  Horizontal (pixels)                           |
+-------+--------------------------------------------------------------------+--
0,      000.0                                                               525
1,      000.0                                                               N/A
2,      000.0                                                               N/A
3,      000.0                                                               N/A
4,      000.0                                                               N/A
5,      000.0                                                               N/A
6,      000.0                                                               N/A
7,      000.0                                                               N/A
8,      000.0                                                               N/A
9,      000.0                                                               N/A
a,      000.0                                                               N/A
b,      000.0                                                               N/A
c,      000.0                                                               N/A
d,      000.0                                                               N/A
e,      000.0                                                               N/A
f,      000.0                                                               N/A

Press: '0 ~ 9' or 'A ~ F' to select channel to edit.
Press: 'M' to move/copy channel configuration.
Press: 'Z' to set ALL channels to factory defaults.
Press 'ESC' to return to Main Menu.
```

When an input (channel) is selected, the display will show the values for that particular channel:

Figure 122. Timing setup menu for one channel (NTSC shown).

```
Timing -
--------------------------------------------------------------------------------
Reference - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
================================================================================
Selected  - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
--------------------------------------------------------------------------------
Horizontal Timing:
 0.0 to 857.5 pixels (0.5 steps) for 525
 0.0 to 863.5 pixels (0.5 steps) for 625
--------------------------------------------------------------------------------
+---------------------------  Channel                    Line Rate ----------+
|                                                                            |
|       +--------------------  Horizontal (pixels)                           |
+-------+--------------------------------------------------------------------+--
0,      000.0                                                               525

To Decrement/Increment Horizontal position press: 'F'/'G'.

Press: 'ESC' to ABORT changes and return to the previous Menu.
Press: 'Enter' to ACCEPT changes and select a different channel.
Press: 'Y' to revert back to last settings.
Press: 'Z' to set THIS channel to factory defaults.
```

5.) Setup Picture Enhancer

Picture enhancement selections are summarized in Table 37.

The actual menus are shown on page 207.

Table 37. Picture enhancement selections.

Processing Function Type	Default	Range/Choices Resolution
Detail Enhancer Level	0	0 = Disabled 1 = Low 2 = Medium 3 = High

Figure 123. Picture enhancer menu for NTSC, showing setup for all 16 inputs. PAL display is similar. (Only Input 0 is connected in this example.).

```
Picture Enhancer -
--------------------------------------------------------------------------------
Reference - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
================================================================================
Detail Enhancer Level:
 Disabled     0
 Low          1
 Medium       2
 High         3
--------------------------------------------------------------------------------
+----------------------------  Channel                   Line Rate ----------+
|                                                                           |
|       +--------------------  Detail Enhancer                              |
+-------+-------------------------------------------------------------------+--
0,      0                                                                  525
1,      0                                                                  N/A
2,      0                                                                  N/A
3,      0                                                                  N/A
4,      0                                                                  N/A
5,      0                                                                  N/A
6,      0                                                                  N/A
7,      0                                                                  N/A
8,      0                                                                  N/A
9,      0                                                                  N/A
a,      0                                                                  N/A
b,      0                                                                  N/A
c,      0                                                                  N/A
d,      0                                                                  N/A
e,      0                                                                  N/A
f,      0                                                                  N/A

Press: '0 ~ 9' or 'A ~ F' to select channel to edit.
Press: 'M' to move/copy channel configuration.
Press: 'Z' to set ALL channels to factory defaults.
Press 'ESC' to return to Main Menu.
```

When an input (channel) is selected, the display will show the values for that particular channel (NTSC shown):

Figure 124. Picture enhancer menu for one channel.

```
Picture Enhancer -
--------------------------------------------------------------------------------
Reference - Input 0:    Line Rate: 525  Line Type: NTSC (M, J)
================================================================================
Detail Enhancer Level:
 Disabled     0
 Low          1
 Medium       2
 High         3
--------------------------------------------------------------------------------
+----------------------------  Channel                   Line Rate ----------+
|                                                                           |
|       +--------------------  Detail Enhancer                              |
+-------+-------------------------------------------------------------------+--
0,      0                                                                  525

To Set Picture Enhancer Mode press:     'Q'.

Press: 'ESC' to ABORT changes and return to the previous Menu.
Press: 'Enter' to ACCEPT changes and select a different channel.
Press: 'Y' to revert back to last settings.
Press: 'Z' to set THIS channel to factory defaults.
```

6.) Display Channel status

These menus are shown below.

Figure 125.

```
======= Channel(s) Status Menu Options =======

1.) Display status of channels:      0 thru 3.
2.) Display status of channels:      4 thru 7.
3.) Display status of channels:      8 thru 11.
4.) Display status of channels:     12 thru 15.
5.) Display status of All channels:  0 thru 15.

        Note:
                For option '5', The terminal application must be setup
                to display a width of at least 160 characters.  Otherwise
                the data may be unreadable!

Press 'ESC' to return to Main Menu.

Select a menu option:
```

When a group of inputs (channels) is selected, the display will show the values for those channels:

Figure 126. Channel Status display for four channels.

```
Channels:                          0       1       2       3
----------------------------------------------------------------------------
Video Composite In:
Monochrome Input (On/Off) :        0       0       0       0
Remove Setup (On/Off)     :        0       0       0       0
Chroma Kill (On/Off)      :        0       0       0       0
Video Decode Mode         :        2       2       2       2
AGC Enable (On/Off)       :        1       1       1       1
Input Video Gain (%)      :        100.0   100.0   100.0   100.0
ACC Enable (On/Off)       :        1       1       1       1
Input Chroma Gain (%)     :        100.0   100.0   100.0   100.0

Video Processor:
Insert EDH (On/Off)       :        0       0       0       0
Contrast/Y Gain (%)       :        100.0   100.0   100.0   100.0
Saturation/Chroma Gain (%):        100.0   100.0   100.0   100.0
Brightness/Y Offset (mV)  :        +000.0  +000.0  +000.0  +000.0
Hue/Chroma Phase (Deg)    :        +000.0  +000.0  +000.0  +000.0

Vertical Blanking NTSC:
Notch Decode Mode         :        1       1       1       1
Chroma Kill (On/Off)      :        0       0       0       0
Reserve for Data Mode     :        0       0       0       0
VBI Line Pair: 10/273     :        0       0       0       0
VBI Line Pair: 11/274     :        0       0       0       0
VBI Line Pair: 12/275     :        0       0       0       0
VBI Line Pair: 13/276     :        0       0       0       0
VBI Line Pair: 14/277     :        0       0       0       0
VBI Line Pair: 15/278     :        0       0       0       0
VBI Line Pair: 16/279     :        0       0       0       0
VBI Line Pair: 17/280     :        0       0       0       0
VBI Line Pair: 18/281     :        0       0       0       0
VBI Line Pair: 19/282     :        0       0       0       0
VBI Line Pair: 20/283     :        0       0       0       0
VBI Line Pair: 21/284     :        0       0       0       0
VBI Line Pair: 22/285     :        0       0       0       0
VBI Line Pair: 23/286     :        0       0       0       0

Vertical Blanking PALx:
Notch Decode Mode         :        1       1       1       1
Chroma Kill (On/Off)      :        0       0       0       0
Reserve for Data Mode     :        0       0       0       0
VBI Line Pair: 06/319     :        0       0       0       0
VBI Line Pair: 07/320     :        0       0       0       0
VBI Line Pair: 08/321     :        0       0       0       0
VBI Line Pair: 09/322     :        0       0       0       0
VBI Line Pair: 10/323     :        0       0       0       0
VBI Line Pair: 11/324     :        0       0       0       0
VBI Line Pair: 12/325     :        0       0       0       0
VBI Line Pair: 13/326     :        0       0       0       0
VBI Line Pair: 14/327     :        0       0       0       0
VBI Line Pair: 15/328     :        0       0       0       0
VBI Line Pair: 16/329     :        0       0       0       0
VBI Line Pair: 17/330     :        0       0       0       0
VBI Line Pair: 18/331     :        0       0       0       0
VBI Line Pair: 19/332     :        0       0       0       0
VBI Line Pair: 20/333     :        0       0       0       0
VBI Line Pair: 21/334     :        0       0       0       0
VBI Line Pair: 22/335     :        0       0       0       0
VBI Line Pair: 23/336     :        0       0       0       0
VBI Line Pair: 24/337     :        0       0       0       0
VBI Line Pair: 25/338     :        0       0       0       0
VBI Line Pair: 26/339     :        0       0       0       0

Timing NTSC:
Horizontal (pixels)       :        000.0   000.0   000.0   000.0
Vertical (lines)          :        000     000     000     000
Freeze Mode               :        0       0       0       0

Timing PALx:
Horizontal (pixels)       :        000.0   000.0   000.0   000.0
Vertical (lines)          :        000     000     000     000
Freeze Mode               :        0       0       0       0

Picture Enhancement:
Detail Level              :        0       0       0       0

Press any key to return to the "Status Menu"
```

Note Vertical timing and Freeze modes are not implemented.

7.) Save or Recall a Configuration File

This selection allows a setup to be saved on the PC and recalled. For example, if a particular source requires a video level correction, a file named "VTR3_in7_vid_gain" could be downloaded when needed.

To Save a File On PC

This procedure assumes that video adjustment(s) have been made (as described above) and need to be saved for future use.

a. Select "Save or Recall a configuration file."

b. Select "Save a configuration file to the PC."

Response:

```
Prepare your terminal emulator to receive (upload) data now...
```

c. For Hyper terminal, select "Transfer > Receive File."

d. Create or browse to a directory on the PC where the file will be stored.

Suggestion: "c:\Program Files\Thomson\Trinix\VI-33100."

e. Select **Xmodem** for the protocol. Then select "Receive."

f. Enter a filename where the data will be saved on the PC.

Suggestion: "config1."

Note: If you enter the name of an existing file the software will automatically append a number suffix and save the file under the new name.

g. Select "OK."

To Recall a File From PC to VI Board

a. Select "Save or Recall a configuration file."

b. Select "Recall and LOAD a configuration file from PC."

Response:

```
Prepare your terminal emulator to send (download) data now...
```

c. For Hyper terminal, select "Transfer > Send File."

d. Browse to the desired configuration file on the PC.

e. Select "Xmodem" for the protocol. Then select "Send."

Section 7

Troubleshooting

LEDs

Front panel

	Display	Meaning
POWER/ALARM	Red	Master alarm for this chassis: check internal alarm LEDs
	Green	Power on, chassis OK
	Amber	Secondary warning: single fan failure or secondary NR board is active. Check internal alarm LEDs
	Off	System is not powered

Power supplies

	Display	Meaning
AC OK	Green	AC Power OK
	Off	Supply is not powered (or is not operating)
DC OK	Green	DC power OK
	Off	Supply is not powered (or is not operating)

Fans

	Display	Meaning
FAN ALARM	Red	Check fan
	Off	Fan OK

Input boards - SI-33110 SD and HI-33110 HD

Part side

	Ref	Display	Meaning
ALARM	DS601	Red	Master alarm for this board. A DC supply has failed to turn on
		Off	Board OK
-5VAOK	DS31	Green	-5 VA supply OK
		Off	Check -5 VA supply
IN_USE	DS602		Reserved for future use

Matrix board - DM-33100

Part side

	Ref	Display	Meaning
PALARM	DS952	Red	Primary alarm for this board. A DC supply has failed on the board or the microcontroller
		Off	Board OK
3V3	DS951	Green	3V3 is OK
		Off	Check 3V3
INUSE	DS901	Yellow	1 or more crosspoints now in use on this board
		Off	No crosspoints in use on this board
-3V3	DS31	Green	-3V3 is OK
		Off	Check -3V3
DONE	DS950	Green	The Xilinx FPGAs are properly configured
		Off	FPGAs failed to configure

512 Matrix board - DM-33501/33502

Part side

	Ref	Display	Meaning
IN USE A	DS201_1	Yellow	A crosspoint is active in XPT_A IC
		Off	No crosspoints are active in XPT_A IC
P2V5A OK	DS204_1	Green	P2V5A converter is OK (for XPT_A side)
		Off	P2V5A converter has failed
IN USE B	DS201_2	Yellow	A crosspoint is active in XPT_B IC
		Off	No crosspoints are active in XPT_B IC
XC DONE	DS402	Green	FPGAs are configured
		Off	FPGAs are not configured
ALARM	DS401	Red	One or more fault conditions exist
		Off	Normal operation
P2V5B OK	DS204_2	Green	P2V5B converter is OK (for XPT_B side)
		Off	P2V5B converter has failed
P5V	DS901	Green	Logic supply is OK
		Off	Logic supply has failed
PS1 OK	-	Green	Main DC-DC Converter 1 is OK
		Off	Main DC-DC Converter 1 has failed
PS2 OK	-	Green	Main DC-DC Converter 2 is OK
		Off	Main DC-DC Converter 2 has failed

Output boards - SO-33110 SD and HO-33110 HD

Part side

	Ref	Display	Meaning
INUSE	DS3	Yellow	1 or more crosspoints now in use on this board*
		Off	No crosspoints in use on this board
DONE	DS501	Green	The Xilinx FPGAs are properly configured
		Off	FPGAs failed to configure
+10V	DS41	Green	+10 V supply OK
		Off	Check +10 V supply
+5VA	DS31	Green	+5VA supply OK
		Off	Check +5VA supply
3.3V	DS51	Green	3.3 V supply OK
		Off	Check 3.3 V supply
ALARM	DS601	Red	Master alarm for this board
		Off	Board OK

*Trinix 512 Output Card Used as Power Source Only - In some expanded DV-33512 systems, a single output board will be the only board in one section of the router. This board is used to provide power to certain components on some of the input boards. Although the INUSE light is always Off, this board should not be removed (e.g., to swap with another output board). If the board is removed, alarm lights will appear and some loss of Broadlinx web page browsing functionality may occur. However, the router will continue to switch, even when the Broadlinx board is being used to control the system (as in Encore applications).

Output board - HO-33120 HD

Part side

	Ref	Display	Meaning
XC_DONE	DS568	Green	The Xilinx FPGAs are properly configured
		Off	FPGAs failed to configure
P5V	DS901	Green	+5 V supply voltage present
		Off	Check +5 V supply
INUSE	DS3	Yellow	1 or more outputs now in use on this board*
		Off	No crosspoints in use on this board

P_ALRM_N	DS901	Red	Master alarm for this board
		Off	Board OK

SR-33000 Sync Reference / Output Monitor (OPM) board

Part side

	Ref	Display	Meaning
RX	DS509	Green	Receive COM bus activity
TX	DS510	Green	Send COM bus activity

Dip side

IN_USE	DS	Yellow	Output Monitor is active
XLD		Green	Xilinx load done
3V3+OK		Green	3V3 supply OK
5V+OK		Green	5V+ supply OK
10VOK		Green	10 V supply OK
REF_ALRM B		Yellow	Reference B alarm
REF_ALRM A		Yellow	Reference A alarm
PALRM		Red	Primary alarm
SALRM		Yellow	Secondary alarm (single fan failure)

NR-33000 NIC/Sync/OPM board

Part side

	Ref	Display	Meaning
SW OVR	DS1	Yellow	Software override switches

ACTIVE	DS2	Solid yellow	This card has control of Com Bus and/ or Crosspoint Bus. Crosspoint bus active. Internal XPT control.
ACTIVE	DS2	Dim or blinking yellow	This card has control of Com Bus. Com bus activity. External XPT control (e.g. Jupiter VM-3000).

Dip side

	Ref	Display	Meaning
USE	DS	Yellow	Output monitor is active
XOK		Green	Xilinx load done
3V3		Green	3V3 supply OK
		Off	Check 3V3 supply
5VA		Green	5 VA supply OK
		Off	Check 5 VA supply
10V		Green	10 V (A and B) supplies OK
		Off	10 V (A and/or B) supply alarm. Failure of both A and B will also trigger PALARM.
A REF		Yellow	Reference A alarm
B REF		Yellow	Reference B alarm
PALR		Red	Primary alarm
SALR		Yellow	Secondary alarm: single fan failure
LAN		Flashing green	LAN activity
LINK		Green	LAN link OK
Dual 7-segment LEDs		Numeric pattern	CPU codes. See below
		Flashing decimal points	Broadlinx code is loading (faster flashing indicates increase in interrupt rate)
		Spinning pattern	CPU running with Broadlinx code loaded (faster spinning indicates increase in interrupt rate)

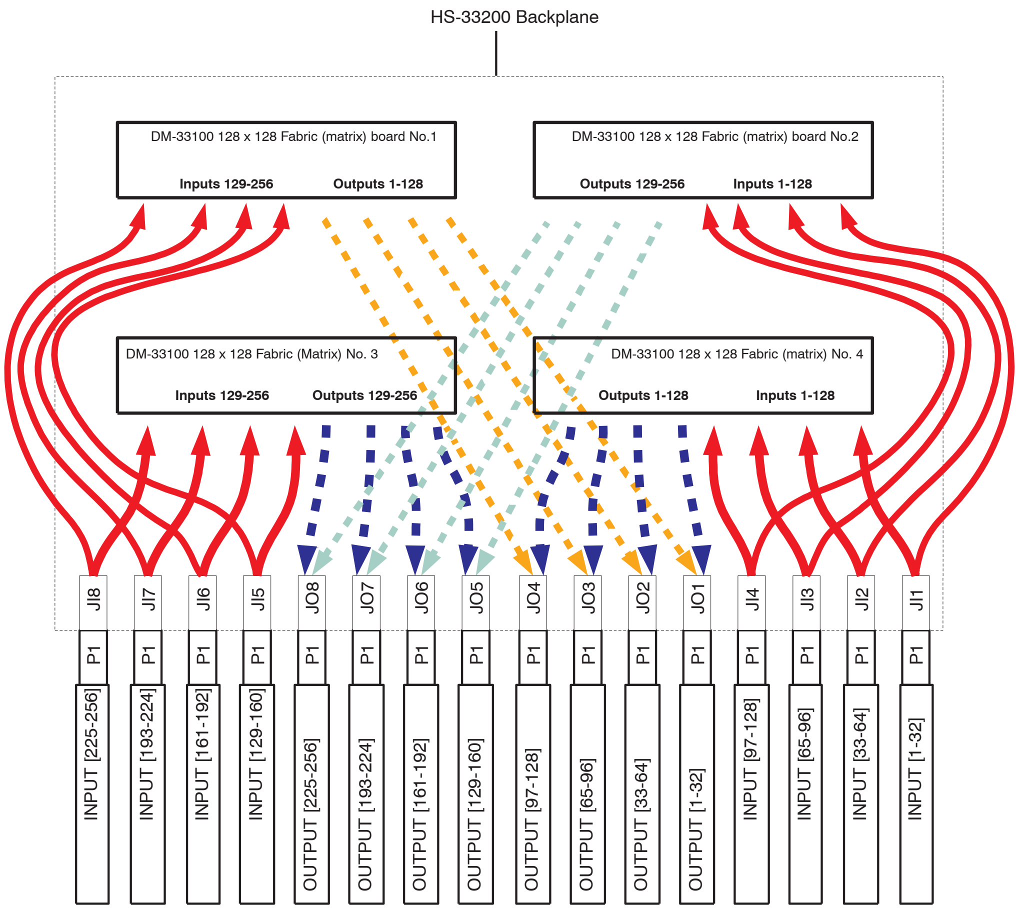
NR-33000 dual 7-segment LED CPU codes

```
S.0  End of bus 0 first access to segment display if the start type is
     BOOT_COLD
S.1  End of bus 1
B.C  If there is a memory check sum error in the EEPROM.
1.C  If there is an I2C timeout while communicating with the SDRAM mod-
ule.
B r  If there is a DRAM error (unable to determine the memory size,
                               Not a 32,64,128,256 MB memory bank).
3 2  If a 32 MB memory bank.
6 4  If a 64 MB memory bank.
2 8  If a 128 MB memory bank.
5 6  If a 256 MB memory bank.
1 2  If a 521 MB memory bank.
S.2  End of Bus 2
S.3  End of Bus 3
S.4  End of Bus 4
S.5  End of Bus 5
S.6  End of Bus 6
S.7  End of Bus 7

     Start VxWorks Boot process:

sysPhysMemSize() Retrieve auto-sized memory.
B r   Bad Ram
3 2   32 MB ram
6 4   64
2 8  128
5 6  256
1 2  512

PCI bus
P.0  When the pci system is initialized and the switch is in position 7
PC-BP
     The lsd increments while the PC BIOS is configuring the bus.
P.P. When the secondary bus, atu and bridge initialization is done.
P.P  After the private PCI bus devices have been initialized and PCI init
is
     done.
E.1.  If unable to do a configuration read on the secondary PCI bridge.
Dev 7
E.2.  If unable to do a configuration read on the secondary PCI bridge.
Dev 0
     While initializing the Ethernet chip.
```

Signal flow

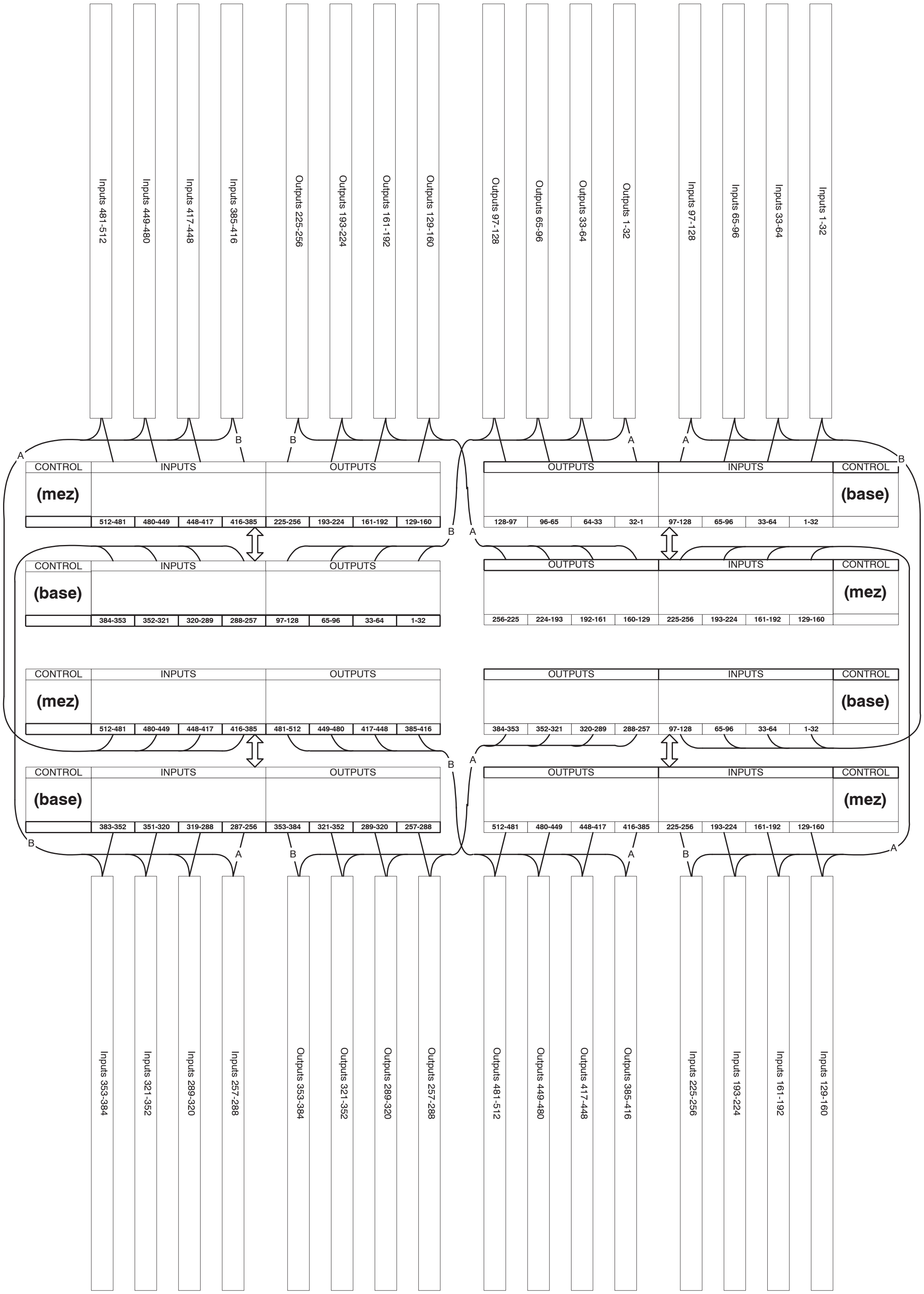
Signal flow for a 256 x 256 router, which requires four matrix cards, is shown below.

Figure 127.



Signal flow for a 512 x 512 router, which requires four DM-33500 modules is shown in Figure 128.

Figure 128.



Inputs 481-512
Inputs 449-480
Inputs 417-448
Inputs 385-416
Outputs 225-256
Outputs 193-224
Outputs 161-192
Outputs 129-160
Outputs 97-128
Outputs 65-96
Outputs 33-64
Outputs 1-32
Inputs 97-128
Inputs 65-96
Inputs 33-64
Inputs 1-32
CONTROL
INPUTS
OUTPUTS
(mez)
512-481 480-449 448-417 416-385 225-256 193-224 161-192 129-160
OUTPUTS
INPUTS
CONTROL
(base)
128-97 96-65 64-33 32-1 97-128 65-96 33-64 1-32
CONTROL
INPUTS
OUTPUTS
(base)
384-353 352-321 320-289 288-257 97-128 65-96 33-64 1-32
OUTPUTS
INPUTS
CONTROL
(mez)
256-225 224-193 192-161 160-129 225-256 193-224 161-192 129-160
CONTROL
INPUTS
OUTPUTS
(mez)
512-481 480-449 448-417 416-385 481-512 449-480 417-448 385-416
OUTPUTS
INPUTS
CONTROL
(base)
384-353 352-321 320-289 288-257 97-128 65-96 33-64 1-32
CONTROL
INPUTS
OUTPUTS
(base)
383-352 351-320 319-288 287-256 353-384 321-352 289-320 257-288
OUTPUTS
INPUTS
CONTROL
(mez)
512-481 480-449 448-417 416-385 225-256 193-224 161-192 129-160
A
B
Inputs 353-384
Inputs 321-352
Inputs 289-320
Inputs 257-288
Outputs 353-384
Outputs 321-352
Outputs 289-320
Outputs 257-288
Outputs 481-512
Outputs 449-480
Outputs 417-448
Outputs 385-416
Inputs 225-256
Inputs 193-224
Inputs 161-192
Inputs 129-160

Appendix **A**

SNMP Managers

Adding SNMP Managers

This appendix describes special procedures for adding a new SNMP Manager to any matrix when the user is NOT using NetCentral as the SNMP Manager.

1. Send a GET request for *gvgTtCfgTableNextIndex* variable defined in GVG-ELEMENT-MIB e.g.: if it returns 2.

2. Create a new Row in the Trap target table by sending a SET request for the *gvgTtCfgEntryStatus(1.3.6.1.4.1.4947.2.1.3.3.1.4).index***,** where *index* is the value returned in Step 1 above.

   E.g.: in this case generate a SET request for 1.3.6.1.4.1.4947.2.1.3.3.1.4.**2,** where **2** is the next available index and syntax is INTEGER32. Set the value as 5 (*create and wait*). If the SET request is successful proceed to the next step.

   The SET request could be unsuccessful if:

   - The row for the above index already exists.
   - The number of registered managers count in the SNMP Agent database has reached the maximum allowed. A maximum of 5 managers can be registered at one time. All subsequent attempts to register additional managers will fail unless existing managers are deleted from its database.

3. Send a SET request for *gvgTtCfgIpAddress (1.3.6.1.4.1.4947.2.1.3.3.1.2) .index,* where *index* is the value returned in Step 1 above.

   E.g.: in this case generate a SET request for 1.3.6.1.4.1.4947.2.1.3.3.1.2.**2,** where **2** is the next available index and syntax is IPADDRES. Enter the IP address of the SNMP Manager to be registered. If the SET request is successful proceed to the next step.

The SET request could be unsuccessful if:

- The above IP address is already present in the Trap target table.

4. Send a SET request for *gvgTtCfgCommunity(1.3.6.1.4.1.4947.2.1.3.3.1.3).index,* where *index* is the value returned in Step 1 above.

   E.g.: in this case generate a SET request for 1.3.6.1.4.1.4947.2.1.3.3.1.3.**2,** where **2** is the next available index and syntax is OCTET STRING. Enter the community string that would be used for the communication between matrixes (Trinix/Concerto/7500WB/7500NB) and SNMP Managers.

5. Now Send a SET request for *gvgTtCfgEntryStatus (1.3.6.1.4.1.4947.2.1.3.3.1.4).index,* where *index* is the value returned in Step 1 above and the value is 1 (Active). This will activate the newly created row. If this SET request is successful, you are all set to receive the Traps.

Deleting SNMP Managers

You may wish to delete SNMP Managers:

- If the machine running the SNMP manager's IP Address is changed.
- If you no longer wish to monitor the controller from some of the SNMP managers.
- If you wish to add more SNMP managers, but the SNMP agent does not allow you to do so because the maximum number of managers are already registered, you may want to delete some of the SNMP managers which you no longer use.

If you find yourself in any of the above situations please follow the steps given below:

1. Walk through the *gvgTtCfgIpAddress* and note the index of the row you would like to delete.

2. Delete the above selected Row from the Trap target table by sending a SET request for the *gvgTtCfgEntryStatus (1.3.6.1.4.1.4947.2.1.3.3.1.4).index***,** where *index* is the value returned in Step 1 above and syntax is INTEGER32; set the value as 6(*destroy*).

   If the SET request is successful then you may add new SNMP Managers as described above.

   The SET request could be unsuccessful if:

   - The above row is already deleted from the Trap target table.

Glossary

Note: terms set in SMALL CAPS are defined within this glossary.

10/100BaseT - an ETHERNET configuration that uses twisted pair wiring (typically Cat 5 UTP unshielded twisted pair cable with RJ45 8-pin connectors) to transmit data up to 100 Mbps.

binary super crosspoint bus - similar to super crosspoint bus, but the units digits are allowed to cover the range of 0 to F, rather than 0-9 as in previous switcher systems. Generated only by the Jupiter, CE-2500, and BCS-3000 control systems.

bus - in distribution switching, a channel leading to an output or destination. Example: "controls 20 buses" means being able to select sources for 20 destinations.

CPL - Control Point Language. Protocol used to control router through Encore / SMS 7000 Ethernet connection. In Trinix applications, the connection is made to a NR-33000 Broadlinx board.

CPLD - Complex Programmable Logic Device.

crosspoint - distribution switcher circuit where input signal can be connected to output bus. A 10 x 10 crosspoint board has 100 crosspoints.

crosspoint bus - Also called the *matrix bus.* A five-pair bus that carries switching and status commands between the crosspoint (matrix) cards and the control device.

The control device could be any one of a large number of devices, including a CE-300A Control Board (internal to Mars), a SC-400 Control Board (internal to Venus), a CE-3000 Matrix Controller (BCS-3000 control system), a CE-2500 Control Electronics chassis, a VM-3000 Control Processor (Jupiter), or a CE-2200 (PARTY LINE system).

The protocol for this bus has changed through the years to accommodate larger and larger switchers with increasing numbers of levels, being identified as "standard," "extended," "super," and "binary." For example, the binary protocol uses binary (rather than BCD) coding to increase maximum control size to 1024 x 1024 on 127 levels.

The "octal" protocol type is used only for Mars switchers.

For additional information, refer to the "Switcher Control Rulebook" appendix of the *Party Line Control Maintenance Manual*, Grass Valley part no. 04-043473-010.

DHCP - Dynamic Host Configuration Protocol. Provides automatic TCP/IP configuration when a DHCP server is present on the network.

DVB-ASI - Digital Video Broadcasting - Asynchronous Serial Interface.

EBU - European Broadcasting Union. Internet address: http://www.ebu.ch/.

extended crosspoint bus - see CROSSPOINT BUS.

fabric board - DM-33100 matrix board used in Trinix router.

FPGA - Field Programmable Gate Array.

HI-33110- precursor to HI-33200 SD/HD Input Module. Consists of a 16-input base board (HI-33110) and a 16-input mezzanine board (HI-33011), providing 32 inputs. The module supports data rates of 3 Mbps to 1.485 Gbps. A "gain cell" is included on this board to be used in conjunction with the port expanders in order to create multi-chassis routers.

level - historically, a switcher matrix that carries one type of signal, as determined by DIP switch settings on crosspoint boards. Example: level 1 for video, levels 2 and 4 for left and right audio, etc. However, in 3-stage switching systems this switch-set level is referred to as the "physical" level; and large systems may require more than one physical level to provide enough hardware for an entire "logical" level (such as video). The Jupiter Physical Switching menu refers to a "logical level" that is actually the logical level *number,* this being the row number on which the level is identified on the Switcher Level Descriptions table. The logical level *name* also appears on this table.

matrix bus - see CROSSPOINT BUS.

OPM - OUTPUT MONITOR.

output monitoring - feature of routing switcher which allows control system to verify switcher performance without interrupting normal operations. A separate, internal switching system is used to switch the Monitor Output to any *output* of the switcher.

physical level - see LEVEL.

refresh - continuous repetition of switching instructions and confirmation of crosspoint status. Reports any interruption of service – for example, if crosspoint board is removed. When board is replaced, automatically restores previous switch instructions.

SMPTE - Society of Motion Picture and Television Engineers. URL: http://www.smpte.org.

SMPTE 259M-1997 - Television standard: "10-Bit 4:2:2 Component and 4fsc Composite Digital Signals - Serial Digital Interface."

SMPTE 269M-1999 - Television standard - "Fault Reporting in Television Systems."

SMPTE 274M-1998 - Television standard: "1920 x 1080 Scanning and Analog and Parallel Digital Interfaces for Multiple Picture Rates."

SMPTE 292M-1998 - Television standard: "Bit-Serial Digital Interface for High-Definition Television Systems."

SNMP - Simple Network Management Protocol.

status - in a distribution switcher, a display indicating what source is currently switched to a given destination.

super crosspoint bus - see CROSSPOINT BUS.

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Symbols

Numerics

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